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. L 6

Descriptive
Manual Training Course
Elementary Schools

Los Angeles City School District
School Publication No. 35
June, 1921



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by

C. A. Kunou

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Preface

This outline of the manual training work in the elementary schools is planned for the A-4 to the A-8 grades inclusive. It is both descriptive and analytical in arrangement. There are certain things to which attention should be called.

First, the outline combines the features of a text book with those of a course of study proper, in order to suggest to teachers material of an informational nature to be used in instruction.

Second, the outline points the way to orderly procedure in teaching and emphasizes Principle as the basis of design, color and construction.

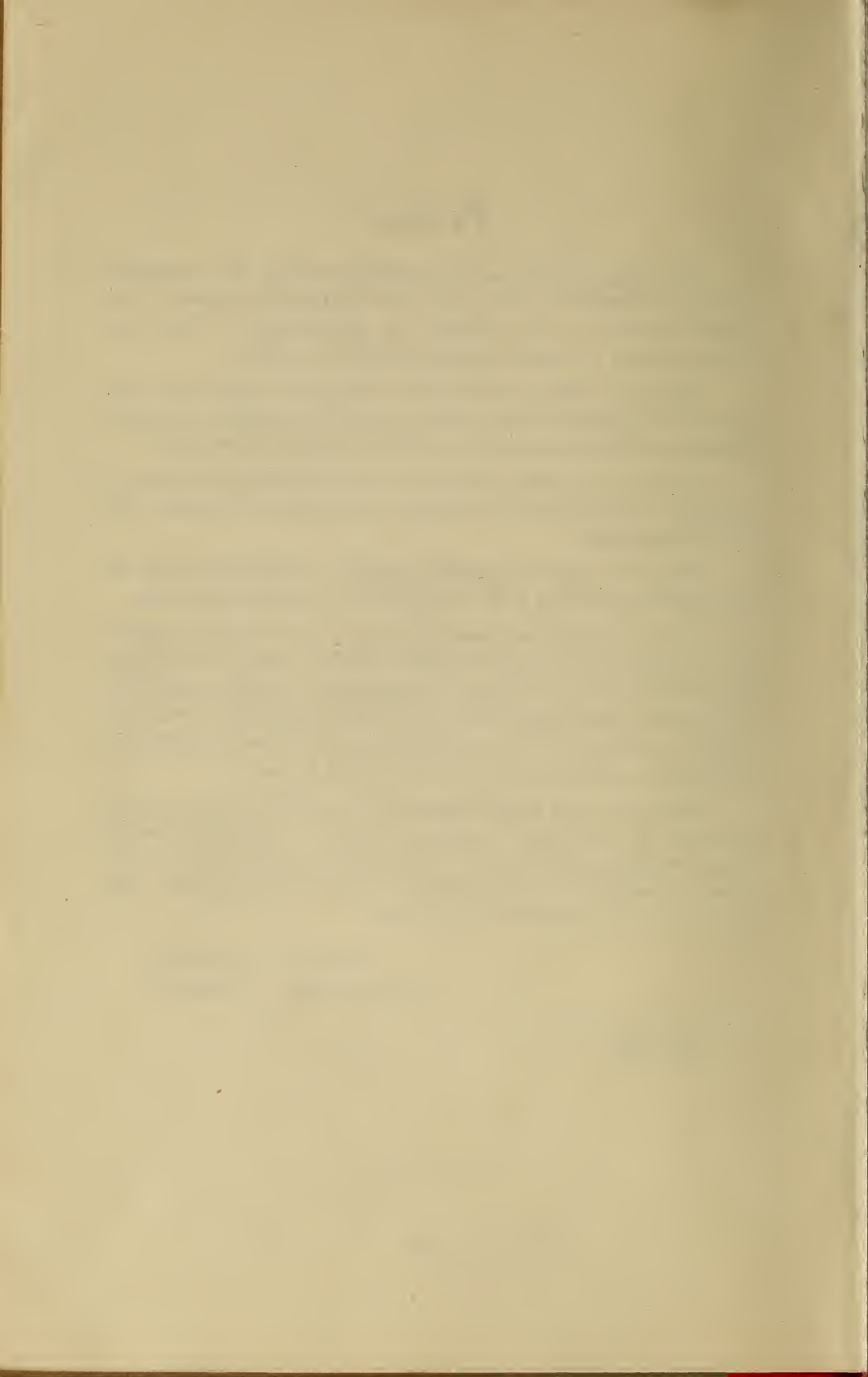
Third, the outline furnishes material for informational and investigation work as well as material for construction work.

Under informational instruction are classed those suggestions which lead the pupil to make inquiries and to investigate for himself as in the making of specifications and the application of principles and proportion; also in the study of the materials which are used and in the attempted inquiries into the industrial significance and application of the things learned.

Under the term **construction** are listed the several processes necessary in the actual "making of objects." It includes wood-work, finishing work, such as shellacking, varnishing and work with oil paints. It also includes activities in materials other than wood as indicated in the outline.

SUSAN M. DORSEY,
Superintendent of Schools.

Los Angeles, Cal.,
June 1921.



THE OUTLINE

The course in manual work herein outlined for the elementary schools, is the result of observations and experiences of many years of teaching and supervision. The outline has been compiled with the aid of an advisory committee of teachers, and after being presented and discussed at teachers' conferences was accepted by the entire body of manual training teachers of the elementary schools.

While work in wood constitutes the main feature in the scheme of manual training, other activities such as clay work, plaster paris work, leather work, reed work, heavy paper and card board work are included in the general plan.

Finishing and painting are parts of the course and go hand in hand with the wood work in every manual training room in the elementary schools of the city.

Work in earth materials consists for the most part of the modeling of plaques and tiles in clay and casting the same in plaster paris. This form of manual arts is done only when teachers are prepared to do it, and in schools where time permits.

Leather work, including the making of bill books, cases, belts and shoe repairing, is applied in some of the so called neighborhood schools. Reed work, such as basketry and the weaving of chair seats, is done in many of the elementary schools where conditions and circumstances seem to require and permit. Work in heavy paper, confined to portfolio and lantern construction, is done where it is deemed expedient and where teachers are prepared to do such work. Various kinds of repairs and chores are performed in all elementary manual training rooms, by so called repair squads and by opportunity classes, and also by pupils who occasionally elect to do this kind of work. This work is recorded on blanks, specifying and showing the time consumed, the amount of materials and the cost, also the value of the work to the department or to the home.

The course also includes important co-operative features, such as the making of agricultural implements in connection with school and home garden work, while birdhouses, fly traps and boxes for the mounting of collected insects are made in connection with the work for the Nature-Study Department.

Kite construction with its tournaments, at which large numbers of pupils, boys and girls, come together and display their improvisations, are pleasing features of the manual training scheme.

Occasionally so called bazaars are held at which childrens' hand work is sold and the proceeds applied to some practical or charitable use.

Another feature is the Americanization work, consisting of manual training for grown up people, both men and women. Basketry and weaving is usually given to women, while men are given wood work and also various repairs of things in the homes.

This descriptive outline shows that some of the manual training work entering in as a factor in the general scheme yet does not lend itself readily to an exact and analytical outline. As a course it is organized and applied as the conditions of each locality may require in order to meet the educational demands and needs of the pupils in the respective localities.

Statement of Aim.

The entire scheme of manual training in the elementary schools should be classed as educational in its aims. It should seek to adjust the work, as far as it is possible, to individual pupils by variety of work and its methods of instruction.

Definition of Method of Instruction.

The method of instruction should be the revelatory method, that is, the method by which principles and laws inherent in the problems are revealed as contrasted with a method by which mere personal opinions and so-called systems are imposed.

STATEMENT OF PROCEDURE IN GENERAL

As a rule the procedure in all work should be:—

1st step. Pupils make a rough sketch.

2nd step. Pupils make a working drawing from it.

3rd step. Pupils make a specification including study of materials.

4th Step. Pupils carry out the plan, constructing the object.

GENERAL SCHEME OF RELATED STUDIES

Study confined to materials with which pupils come in contact. Also such other materials which serve to impart information by contrast, comparison, and investigation.

Habitat of trees. Process of conversion of raw materials into commercial products, such as Lumber, earth material, oils, glues, shellac, etc.	} Locality, People, Geography.
---	-----------------------------------

Botanical structure, growth, formation, cells and tissues.	} Botany, Biology.
--	--------------------

Chemical properties, composition. —Chemistry.

Physical properties, strength etc. — Physics.

Origin and formation of iron, clay, }
lime, coal, etc. } Geology.

Mensuration, calculation, computa- }
tion, etc. } Mathematics.

Design, processes of making, con- }
structing, building, etc. } Art, Architecture,
Archeology, History.

Manufacture, transportation, etc. }
opportunities of labor, their wages, } Vocational information
etc., preparations, qualifications, re- } and guidance.
quirements, etc. Life careers. }

REQUIREMENTS

The minimum average requirements in this outline, is the amount of work the average pupil in the different grades is considered capable of doing in a term of twenty weeks with one lesson of one hour and a half per week.

The designs for the required work in the courses are issued by the supervisor's office, so that the work suggested, being definitely decided and stated, may be carried out as a general requirement, in order to obtain somewhat definable and measurable results, and to meet both educational and administrative demands of the department.

FOURTH GRADE

A4 Class

The constructive work in this class consists of toy work in line with the child interest at this stage. The toys are flat profile pieces, mounted on bases, and are painted and finished alike on both sides, and so far as design is concerned, are limited to toys that are stationary in principle. The course suggested consists of two activities, wood work and painting.

TYPE OBJECTS

Average requirement, 2 stationary toys for each pupil.

The supplementary objects to choose from for those pupils

who finish their work quicker than others, are toys involving construction similar to those outlined.

Drawing.

Tracing outline around templet.

Construction.

Coping sawing—contour cutting.

Back sawing—Square cutting.

Assembling—nailing together.

Tools.

Coping saw, buck saw, square, ruler, hammer, coping saw table, woodmitre box (made by upper grade pupils.)

Finishing.

(Undercoating, mixing paints, enameling). In this grade the teacher mixes the paints for the pupils.

Materials.

Wood—Pine $\frac{1}{4}$ " and $\frac{1}{2}$ ". (as a rule).

Brads—Various sizes.

Paints—Under coat, enamel, oil colors.

Informational Instruction.

The names and uses of tools required in the work. Teach the definite constructive process indicated. Study of the materials with which pupils come in contact, such as the names of the kinds of wood; qualities, such as brittleness and softness.

The names of the finishing materials used, such as undercoat, oil colors and enamel, their qualities. For example, undercoat is a base and a filler. Enamel a finish, giving color and gloss. The meaning of the terms shade and tint of one color. (Two-tone color). Pupils to observe how the instructor mixes the paints. Point out opportunities for home work in the making of toys of marketable qualities, also the possibilities in industries of toys and other articles.

FIFTH GRADE

B5 Class

Work on toys continued. Informational instruction in tools and processes continued. The work in this class, however, advances from the making of stationary toys to the making of moving toys.

TYPE OBJECTS

Average requirement for each pupil, 2 moving toys: 1. Toy on wheel; 1. Rocking toy.

Tools—Additional.

Turning saw, spoke shave.

file, screw driver, brad awl.

A5 Class

The main characteristic of the construction work in this class is **outline** and **edge** work, involving the laying out, cutting and dressing of stock to width and length.

TYPE OBJECTS

Average requirement for each pupil, 2 mounts: 1 Breadboard; 1 keyboard.

The supplementary objects chosen for those pupils who finish their work quicker than others, should be such that involve similar, but somewhat more difficult construction processes.

Drawing

Pupils make drawings in **one view** only, and in full size. Teaching of proportions in **two dimensions**—the relation of width to length. Lettering begun.

Construction

Dressing stock to width and length, edge planing, end planing, surface sand papering, treatment of edges, placing and affixing metal fittings.

Tools

Rip saw, cross cut saw.
jack plane, block plane, and bench hook.

Finishing.

Plain staining, waxing and shellacing by polishing with pad.

Materials

Wood: pine, cedar, basswood or poplar, $\frac{1}{2}$ " thick.

Finishes: Water stain, dry color pigments, shellac, pumice stone, sandpaper.

Informational Instruction

Beginning of making bill of lumber, telling its cost per foot. Name of the woods with which pupils come in contact in the work. The names and qualities of the finishing materials taught. Water stain, how to mix it; shellac, its covering and protective qualities and its gloss; pumice stone; the rubbing process begun.

SIXTH GRADE

The main characteristics of the construction work in these classes is the assembling process. The joining of pieces together squarely at the ends—butt joining.

B6 Class

TYPE OBJECTS

Construction of two or more pieces.

Average requirement for each pupil: 1 tie rack or similar object; 1 nail box or 1 knife and fork box.

A6 Class

Average requirement for each pupil: 1 box—revolving hinged lid.

The supplementary work to choose from for those pupils who finish their work quicker than others in these classes, should be objects involving similar construction processes but somewhat advanced and more difficult than the required work. The work should result in practical things, useful in the pupils' homes or in the school. It is expected that at the end of the 6th grade, pupils should understand how to make simple butt joints and to make a box by nailing pieces together.

Drawing.

Lettering continued, name of the object, name of pupil, name of school and grade. Scale, half size. Projection in two views. Law of proportion in three dimensions—relation of length, width and depth taught.

Construction.

Cutting up stock, assembling boxes. Nailing butt joints, making revolving hinged lid. Treatment of edges. Affixing of hinges and other metal fittings.

New Tools.

Nail set, chisel.

Finishing.

Inside and outside finish. (Finish inside before assembling). staining, shellacing, rubbing with pumic stone and water.

Materials.

Wood: Pine, cedar, basswood.

Poplar, $\frac{1}{4}$ " and $\frac{1}{2}$ " thick. Finishes such as waterstain, shellac, rubbing materials.

Informational Instruction.

Making specifications of the object. Computing materials and cost. Continue the study of materials used in the making of boxes in these classes.

SEVENTH GRADE

The main characteristic of the work in this grade, is the elementary joinery as applied in making of objects involving the dressing of stock to three dimensions, the making of simple halved joints, the keyed mortise and tenon joints, and dowel joints.

B7 Class

TYPE OBJECTS

Average requirement for each pupil: 1 Stool or similar object.

A7 Class

Average requirement for each pupil: 1 Taboret or similar object.

Drawing.

Pupils make sketches and from these complete working drawings in three views. The use of scales, such as, $\frac{1}{2}''=1''$ or $\frac{1}{8}''=1''$. Elementary structural design is taught by emphasizing graceful outline and good proportions. The various lines used in working drawings, such as, hidden and construction lines are explained, lettering continued.

Construction.

The process of dressing stock to three dimensions. Principles of joints, such as, keyed and halved joints. Chiseling, filing, fastening with screws, gauging.

Tools.

Chisels, augers, marking gauges.

Finishing.

Staining, shellacking, rubbing with pumic stone and water.

Materials.

Wood: Chiefly pine and cedar $\frac{7}{8}''$ thick.

Informational Instruction.

Study of material continued; complete specifications of the objects made; computing amount and cost of materials, also a short description of the same.

It is expected that pupils at the end of the work of this grade, should understand how to dress stock to three dimensions, how to make a halved joint and mortise and tenon joint.

EIGHTH GRADE

B8 and A8Class

The main characteristic of this work is advanced elementary joinery, mortise and tenoning.

The requirement in this grade is, that each pupil should make an object involving mortise and tenon work:

Suggested Group

1. Plant stand.
2. Umbrella stand.
3. Taboret.
4. Chair.
5. Small table.
6. Costumer or screen.

Drawing.

Structural design, the placing of rails and stretchers according to proper space divisions. Complete the idea, of specifications, also, teach the terms and meaning of plan elevation, and section drawings. Process of blue printing demonstrated and explained.

Construction.

Mortise and tenon construction. The process of laying out work, for example, rails and stretchers are laid out at one and the same time, not one at a time. Mortise gauging, mortise chiseling, tenon sawing. Edge joining and glueing. Finishing, edge treatment.

Tools.

- Mortise gauge, framing chisel.

Finishing.

Staining, shellacing, varnishing, rubbing.

Materials.

Pine $\frac{7}{8}$ " and 2" thick. Pupils who can afford, are asking to furnish their own lumber, such as oak, mahogany or other hardwood.

INFORMATIONAL INSTRUCTION

Study of materials continued. Information regarding industries such as lumber industries; trades such as cabinet making, carpentry, finishing trade; inquiry about life careers of pupils. .

Talks on vocational features such as opportunities, responsibilities, qualifications, etc. in some occupations, ought not to occupy much time, bearing in mind that what the pupils **can do** and **do right** counts most in their **life careers**.

LESSONS ON MATERIALS

The following synopsis of lessons in the study of materials serves to illustrate the kind and amount of subject matter that might be useful to classes of pupils in the various grades. In it also is suggested the amount of time to be given to such work. The question of number of lessons necessary is left to the discretion of the teacher, provided that the informational instruction does not take more than one third of the time allotted to manual work.

Fifth Grade

Purpose.

To acquaint pupils with names of materials, with which they come in contact, to enable them to differentiate between hard and soft woods by sight, touch and smell. To discern structure and grain. To understand working directions. To understand the fact and nature of the **with** and **against** the grain.

Scheme of Lessons.

Kinds of woods: pine, cedar, maple, etc., their names.

Properties: hardness, softness.

Botanical structure: fibres, grain.

Group and classify several kinds of woods to establish that as a rule some wood is hard and tough because it is compact and close grained, and that some wood is soft and brittle because it is porous.

Sixth Grade

Purpose.

Review subjects of fifth grade lessons. To commence to illustrate the botanical anatomy of the living tree, the formation of fibres; the sap process. Commence to observe physical changes, warping, cracking, shrinking, etc. foliage, physical properties of dead wood.

Scheme of Lessons.

Compact wood, (hard, heavy) from trees having broad leaves.

Warping. Its causes.

Shrunk side.
(Concave)

Make Sketch

Swelled side.
(Convex)

When wood gives out moisture it shrinks. When it takes in moisture, it swells. The presence or absence of heat, (different temperatures).

Seventh Grade

Purpose.

To illustrate the anatomy of the living tree. To teach the dead wood's behavior when under the stress of different temperatures. To teach modes of seasoning: natural and artificial. Annual layers, their formation. Age of tree.

Bark.

Sap.

Sapwood.

Heartwood.

Pith.

Make Sketch.

Scheme of Lessons.

Draw figure on blackboard. Explain the different kinds of woods in the tree. Its living process, where? How and why trees become hollow. Study chemical and physical changes; their causes. Warping, its causes. How to prevent and how to rectify. Introduce the subject of how to utilize the forces of nature to do service on materials.

Each lesson should not occupy more than ten to fifteen minutes. Illustrate on blackboard and by samples of woods. Pupils should present illustrations by giving instances of their own observation on the subject in hand.

Eighth Grade

Purpose.

Study different kinds of woods, such as hickory, walnut, oak, magohany, redwood, maple, etc. Their uses. Teach the importance of the Eucalyptus in California. Mention the various substances obtained from trees. Teach the effect of sun and rain on materials.

Scheme of Lessons.

Name accessory products

Tannic acid—oaks.

Sugar—maple.

Turpentine, Tar, etc.—pines.

Barks, cork—cork trees.

Medicinal products—eucalyptus.

Teach uses of the most common commercial woods, their habitats. (History California Eucalyptus 1855, number of species, 160. Tallest Eucalyptus in the world, 480 feet. See Eucalyptus by Abbott Kinney).

How nature's forces, heat, moisture and cold act on wood and other materials causing chemical and physical changes. Teach also why and how to cut off material from being acted upon by these forces. For example, paint not only decorates but also protects materials. Also, some stains are preserving as well as coloring the material on which it is applied.

Call attention to the universal and important use of trees in the life of man.

Continue and review subjects of lessons in 7th Grade. Each lesson not to occupy more than ten to fifteen minutes. Give references to books on subjects in hand. Illustrate with black-board drawings.

SUGGESTIONS RELATING TO THE TEACHING OF WORKING DRAWINGS AND OTHER STRUCTURAL DESIGNS

The intellectual development that comes through constructive work consists among other things, in an ability to discern proportions. This faculty is important in the use of tools and instruments by the pupils. Constructive work is governed by principle and law. Constructive drawing reveals law and relations. The elements of chance do not belong to constructive work of any kind. Minute analysis of processes and materials preclude divergence from plans, and the results will be just what they started out to be. The teacher must know how and plan the work.

The following suggestions will assist in understanding a few elementary principles of proportions and ratios. Some of these, have, by usage, become universally recognized standards. Categorically, working drawings belong to structural design. Structural design depends upon **direction of lines and relation of masses.**

The accompanying drawings illustrate the simple rules of proportions, their application on simple objects and related parts, as in the spacing on calendar and picture mounts; the placing of rails and stretchers on tables and taborets; panel arrangements on doors, etc., all of which show the breaking up of primary mass into related masses. The determination of the size of lids on boxes are shown, also the placing of screweyes, screwhooks and other metal fittings on racks, etc. The affixing of hinges on boxes at proper distances from ends, and the placing of brackets on shelves.

The principles or rules of proportions are modified in their application to suit functions of objects and to suit the artistic

feelings of the designer. There are other so called rhythmic rules, to determine good proportions, but they are more complex and are fundamentally designed from the original principles here represented. The teaching of the above principles in the pupils constructive work and design, will result in a universal knowledge and appreciation of orderly proportions.

It is sometimes claimed that there should be no rules of proportion laid down in constructive drawing. The answer to such a proposition is found in all works of art, craft and architecture which have endured through the ages, and whose sublimity we adore. The presence, grandeur, realism and beauty of works of precision in art, buildings, furniture, and machinery, and even habiliments, such as hats, shoes, etc., overwhelmingly demonstrate that manual training work should teach law, principle and relations in design, color and construction. Without laws of perspective and proportion, there is no art and there are no artists.

PRINCIPLES OF PROPORTION

See Drawings

Group A.

Two dimensions.

Fig. I. So-called Roman Proportions (ratio one to two).

The upper line in the drawing represents the length of the surface of a picture mount, the lower represents the width of the mount. The lower line is equal to one-half the length of the upper line. THE WIDTH OF A SURFACE IS EQUAL TO ONE-HALF ITS LENGTH.

Fig. II. So-called Greek Proportion (ratio two to three).

The upper line in the drawing represents the length of the surface of a calendar mount, the lower line represents the width of the mount. The lower line is equal to two-thirds the upper line. THE WIDTH OF A SURFACE EQUALS TWO-THIRDS ITS LENGTH.

Group B.

Three dimensions.

Fig. I. So-called Roman Proportions (ratio one to two).

The first line in the drawing represents the length of a box, the second line represents the width. THE WIDTH OF A STRUCTURE EQUALS ONE-HALF ITS LENGTH. The third line represents the depth of the box, which is one-half the

width. THE DEPTH OF A STRUCTURE EQUALS ONE-HALF ITS WIDTH.

Fig. II. So-called Greek Proposition (ratio two to three).

The first line represents the length of the box, the second line the width. THE WIDTH OF A STRUCTURE IS TWO-THIRDS ITS LENGTH. The third line represents the depth of the box, which is two-thirds its width. THE DEPTH OF A STRUCTURE EQUALS TWO-THIRDS ITS WIDTH.

Group C.

Principles of related masses and spaces divisions as applied in:

- 1st. The arrangement of picture and calendar on mount as shown in Fig. I.
- 2nd. The panel spacing on a door as shown in Fig. II.
- 3rd. The determination of the sizes of lids on boxes as shown in Fig. IV.
- 4th. The sizes and placing of rails and stretchers on tables, taborets, etc., as shown in Fig. III.

Group D.

Placing of fixtures, decorative elements, etc.

- 1st. Place hinges on a box at a distance of 2" to 1ft. from the end as shown in Fig. I.
- 2nd. Place screweyes on picture frames and other hanging objects and brackets on shelves at a distance of 2" to 1ft. see Figs. II and III.
- 3rd. To place screweyes on keyracks and to place rosettes and other architectural elements of decoration on friezes at proper distances. Screwhooks on keyracks are so placed that the distance from the end to the first hook is one-half the distance between the other hooks as seen in Fig. IV also, see frieze on mantel sketch, Fig. V.

CLASSIFICATION OF CONSTRUCTION PROCESSES

Most constructive problems in woodwork occurring in the elementary schools, may be classified into the following groups:

1st. The Edge or Outline Work.

The edge or outline construction, such as picture mounts, toys and vogue articles, made by planing and coping sawing processes, are objects whose accuracy is not conditioned by

the dimensions of other pieces of material butting against, overlying, telescoping, or revolving around each other. A picture mount may be used even if it falls short of the dimensions planned at the outset, but in constructing a chair or table, the interrelations of the various members are such as to make the structure impossible, if the members and their parts are not accurate in dimensions.

2nd. The Butt Joining Process.

Butt joint construction are those by which one piece of material is joined squarely to the end of another without scarfing, such as in boxes and similar objects.

3rd. The Ply Process.

Ply constructions are those by which one piece of material is laid on to another in layers, such as veneering and other doubling up and overlaying processes.

4th. The Telescope Process.

Telescope constructions are those by which one piece of material is made to slide into another, such as mortise and tenon, drawers and similar objects.

5th. The Revolving Process.

Revolving constructions are those by which a piece is made to swing or revolve around another, as in doors, lids and similar objects.

SUGGESTIONS REGARDING PROPORTIONS OF PIGMENTS IN MIXING COLORS

1. Terra Cotta (red).....1 yellow ; 1 dark red ; 2 white enamel
2. Terra Cotta (brown) 1 yellow ; 1 burnt sienna ; 2 white enamel
3. Olive Green.....yellow shaded with black
4. Bronze 5 chr. green ; 1 black ; 1 umber
5. Chestnut Brown.....3 red ; 1 black ; 2 yellow
6. Chocolate Brown.....vermilion and umber
7. Citrine 3 red ; 2 yellow ; 1 green
8. Wine Red vermilion and black
9. Gray Blue 1 blue ; 1 black ; 9 white enamel
10. Drab: 1 burnt sienna ; 1 yellow ; 2 green ; enamel to tone
11. Purple 3 red ; 2 blue ; white enamel to tone
12. Violet 2 red ; 3 blue ; white enamel to tone
13. Gray 2 red ; 3 green ; add white enamel
14. Russet 3 red ; 2 yellow ; 1 blue
15. Blue Green.....2 blue ; 1 chr. green ; add varnish
16. Light Orange 1 yellow ; 2 red ; tone with white enamel

SUGGESTIONS REGARDING COMPUTATION OF SUPPLIES, WITH SPECIAL REFERENCE TO THE COVERING CAPACITIES OF LIQUID AND PAINT FINISHES.

One coat of:

Water stain	1 gal.	covers	600 sq. feet	hardwood
"	"	1 "	"	400 " " softwood
Varnish	1 "	"	550 "	"
Paint	1 "	"	550 "	"
Wax	1 lb.	"	250 "	"

The above standards apply to level surfaces. If the surface has mouldings and recesses, it requires more of the finishes for covering, particularly with reference to the use of oil paint. These quantities are only approximative in application.

PRINCIPLES OF CONSTRUCTION

See Drawing

1. Cutting up Stock.

- A. Cut from one side or one end of board.
- B. Cut piece $\frac{1}{4}$ " wider and $\frac{1}{4}$ " longer than its finished dimensions.

2. Dressing Stock.

- A. True up one surface.
- B. Make one edge at right angles with it and mark it.
- C. Lay off width. Measure and draw line for width, parallel squared edge.
- D. Plane to width, making second edge square with surface.
- E. Lay off thickness. Gauge lines from the working face and dress to thickness.
- F. Lay off length.
 1. Square one end.
 2. Lay off length and draw line across the board. Saw off and plane to line.
- G. Treatment of corners and edges. Use file for rounding corners. Use sandpaper on block for treatment of edges.
- H. Finishing surface. Use smoothing plane, scraper and sandpaper on block.
- I. Burnishing. Use fine shaving or rag.

Allowance of Lumber and Other Supplies.

Average per capita allowance of lumber for work according to authorized course of study:

In the A-4 classes.....	6	ft.	per	term
" " 5th grade classes.....	14	ft.	per	year
" " 6 " "	14	sq. ft.	"	"
" " 7 " "	15	"	"	"
" " 8 " "	15	"	"	"

In many instances, pupils who can afford, secure their own lumber in the upper grades, and for that reason, the teacher is enabled to allow in some instances, a few additional feet of material to pupils who may not be able to procure their own lumber.

Other supplies are requisitioned on a basis of 200 pupils, and in amounts according to standardized list issued yearly by the department.

TYPES OF SPECIFICATIONS FOR THE GRADES

Specification
 Name of article
 Kind of wood
 Dimensions
 Amount of wood in ft.
 Cost pr. M. (1000 ft.)
 Cost pr. ft.
 Cost of piece
 To match color with surroundings
 Stain
 Composition
 Color
 Finish

SPECIFICATION

NAME OF ARTICLE

KIND OF WOOD

[illegible]

Cost of Lumber.....
 To match color with surroundings
 Stain
 Composition
 Color
 Finish
 Cost of finishing materials
 Cost of metal fittings
 Total Cost.....

PROGRAM

Form 1860 5m 6-29-20

School No.....

.....St. Manual Training Room

.....18.....

LOS ANGELES CITY SCHOOL DISTRICT

Manual Training Program

Period	Monday	Tuesday	Wednesday	Thursday	Friday
9:00-10:30					
10:45-12:00					
1:00-3:00					

Total

Manual Training Teacher.....

Nmber of Benches.....

STATEMENT OF WORK BY MANUAL TRAINING DEPARTMENT ELEMENTARY SCHOOLS

TEACHER _____ SCHOOL _____ 19__

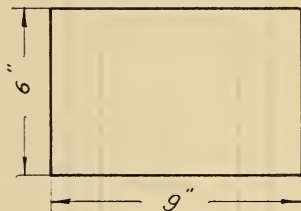
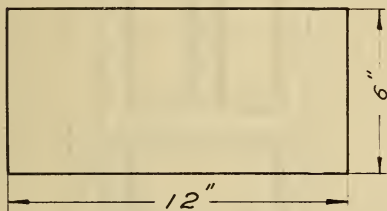
NO.	NAME OF PUPIL	GR.	KIND OF WORK DONE	HRS.	KIND OF MAT.	AMT. OF MAT.	COST OF MATERIAL	VALUE OF WORK	REMARKS
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
									TOTAL VALUE

PRINCIPAL _____

FIG I

GROUP A

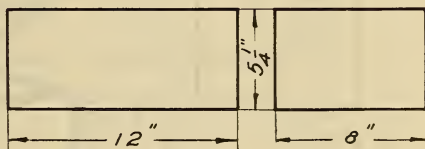
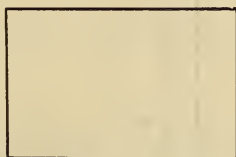
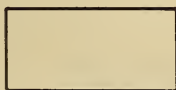
FIG II



GROUP B

FIG I

FIG II



Principles of Proportions Applied

FIG. I

GROUP C

FIG II

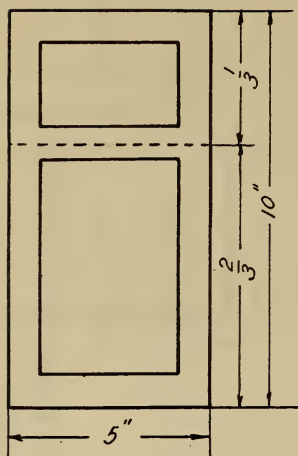
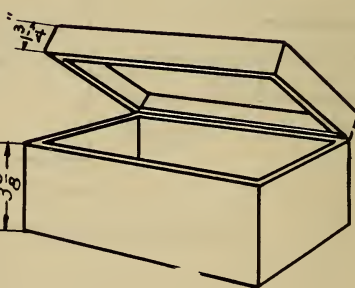


FIG III



FIG IV



Principles of Proportions Applied

GROUP D

FIG. I

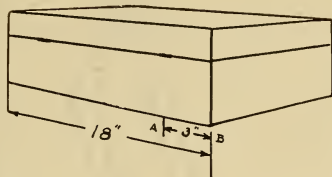


FIG. II

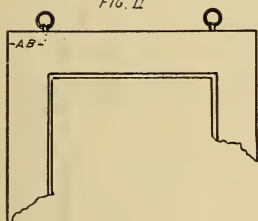


FIG. III

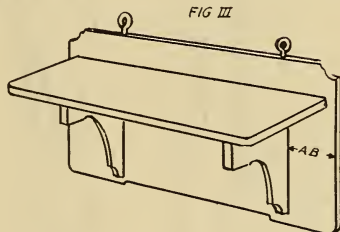


FIG. IV

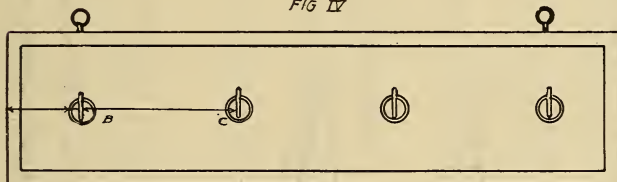


FIG. V



Principles of Proportions Applied

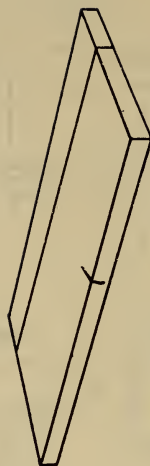
— STEPS IN DRESSING STOCK. —

1ST- TRUE ONE SURFACE.

2ND- MAKE ONE EDGE AT RIGHT ANGLES
TO IT. MARK THUS.



3RD- LAY OFF WIDTH AND DRESS
TO WIDTH



4TH- LAY OFF THICKNESS AND
DRESS TO THICKNESS.

5TH- SQUARE ONE END AND LAY OFF
LENGTH CUT TO LENGTH

GIVE PRACTICE EXERCISES TO MEASURE ACCURACY
AND SPEED OF EXECUTION.

FIFTH AND SIXTH GRADES

ABCDEFGHIJKLMNOPQRSTUVWXYZ $\frac{1}{4}$

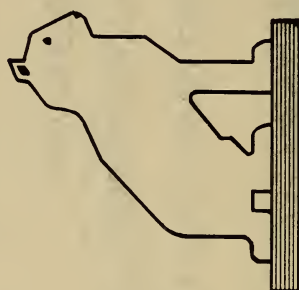
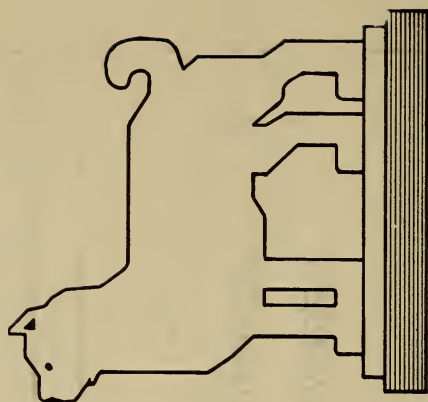
1234567890

SEVENTH AND EIGHTH GRADES

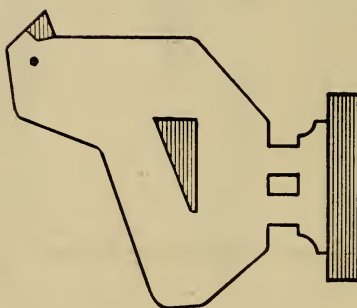
ABCDEFGHIJKLMNOPQRSTUVWXYZ $\frac{1}{2}$

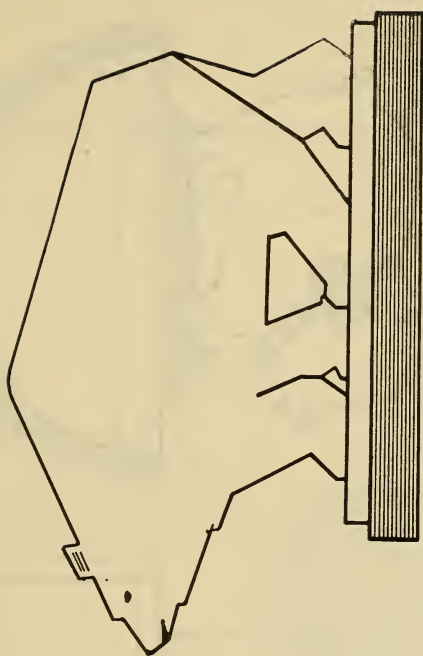
1234567890

_____ CONSTRUCTION LINE _____
 _____ FULL LINE _____
 _____ DIMENSION LINE _____
 HIDDEN LINE



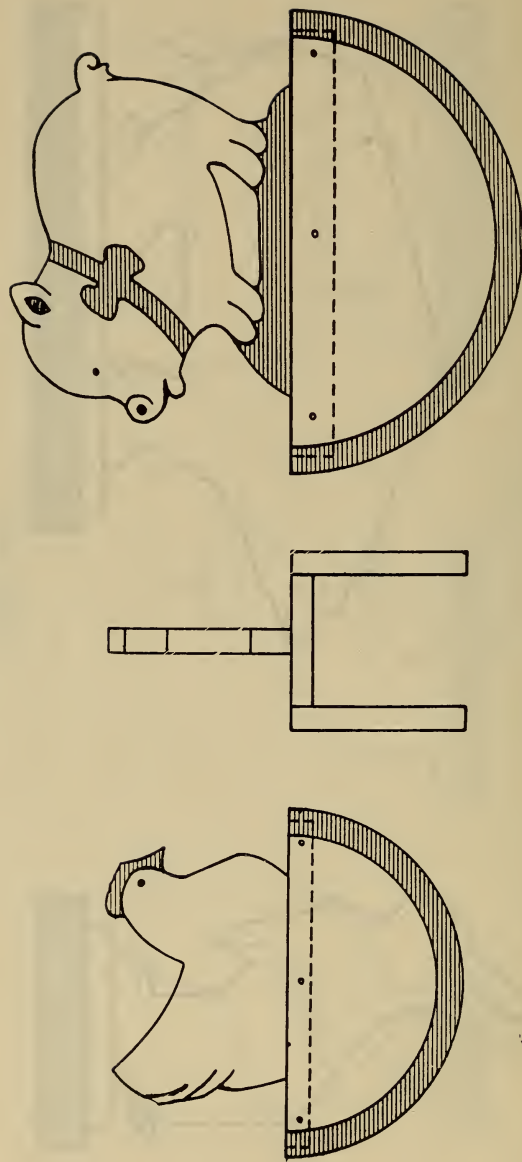
Chick, Dog, Cat



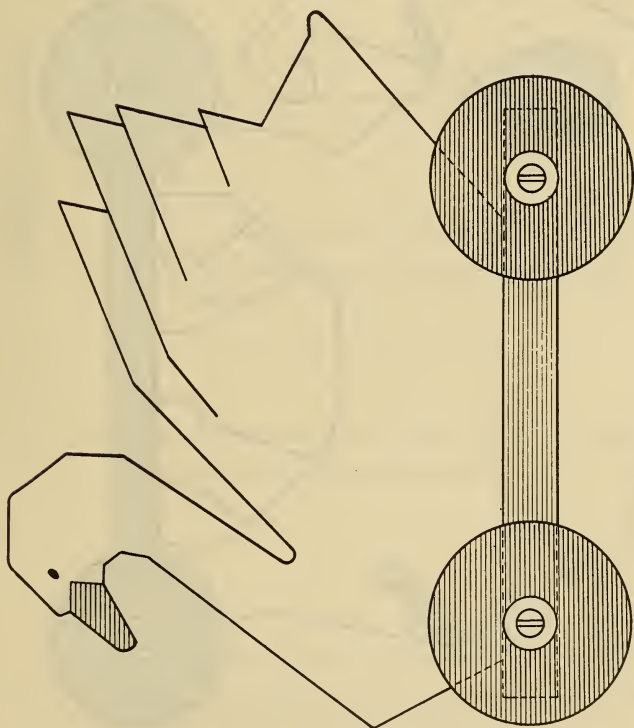
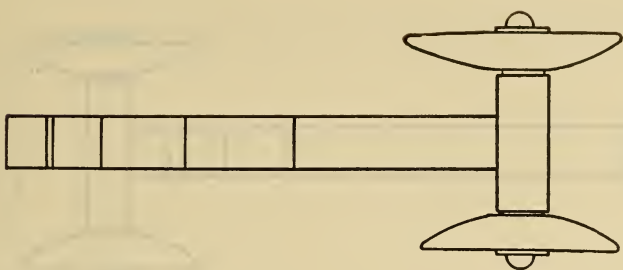


Rabbit, Bear

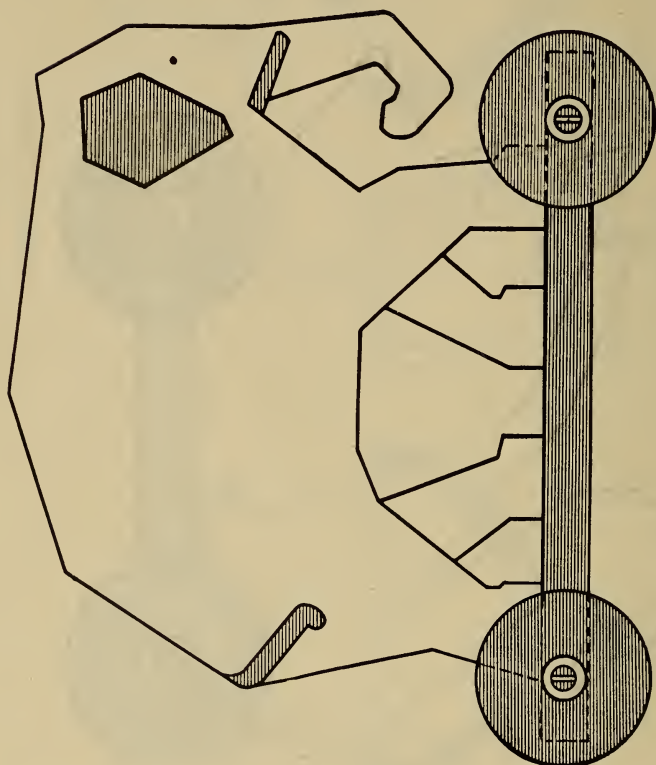
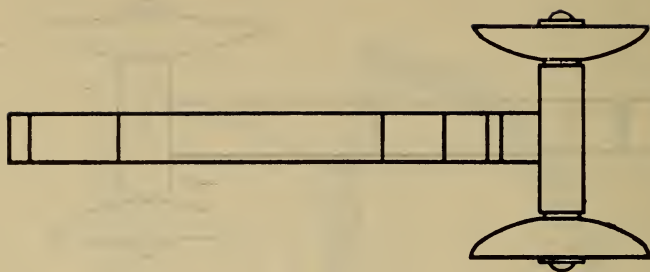




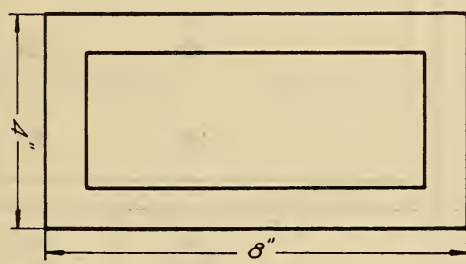
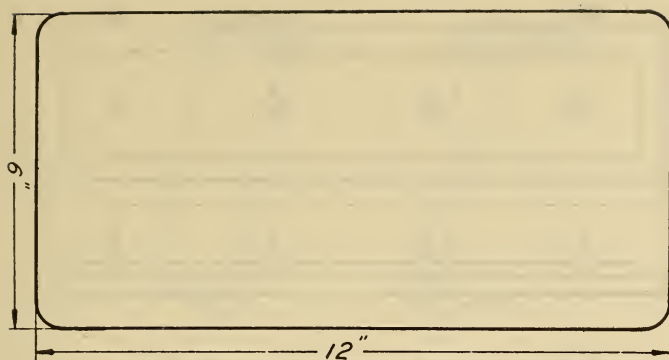
Hen, Pig (Rocking Toys)



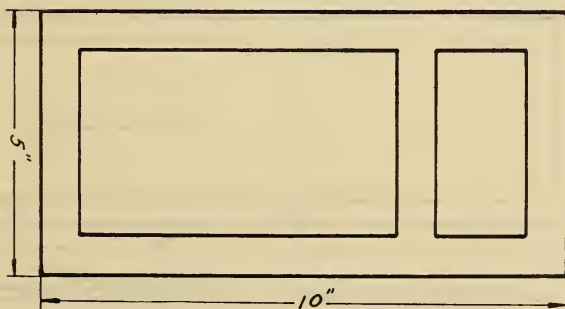
Swan on Wheels

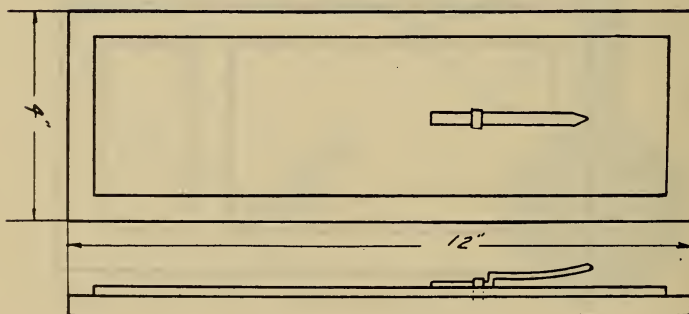
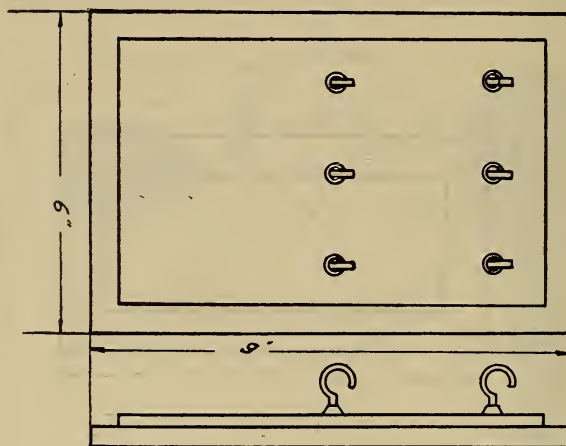
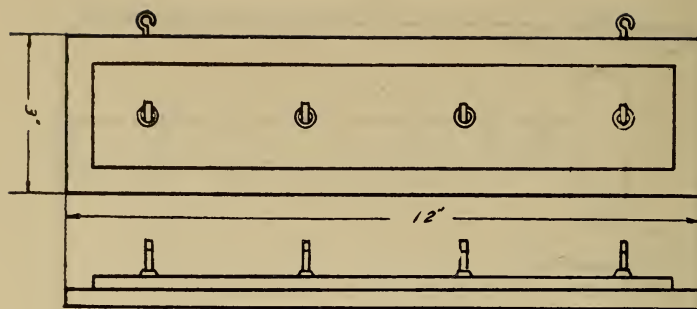


Elephant on Wheels

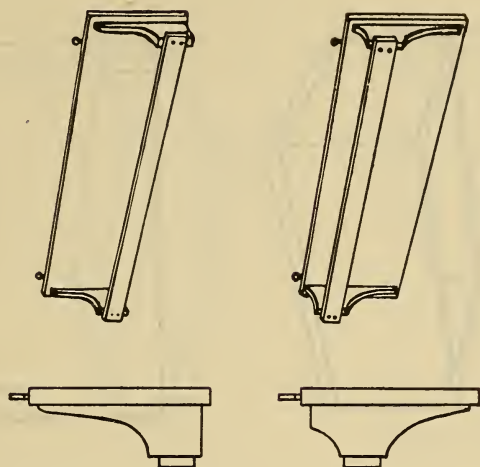


Mounts

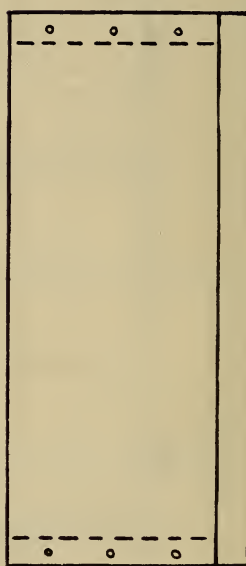
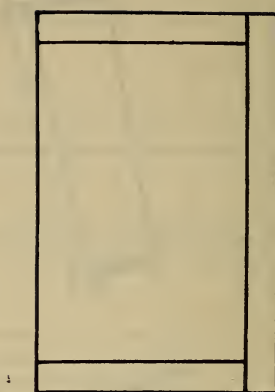




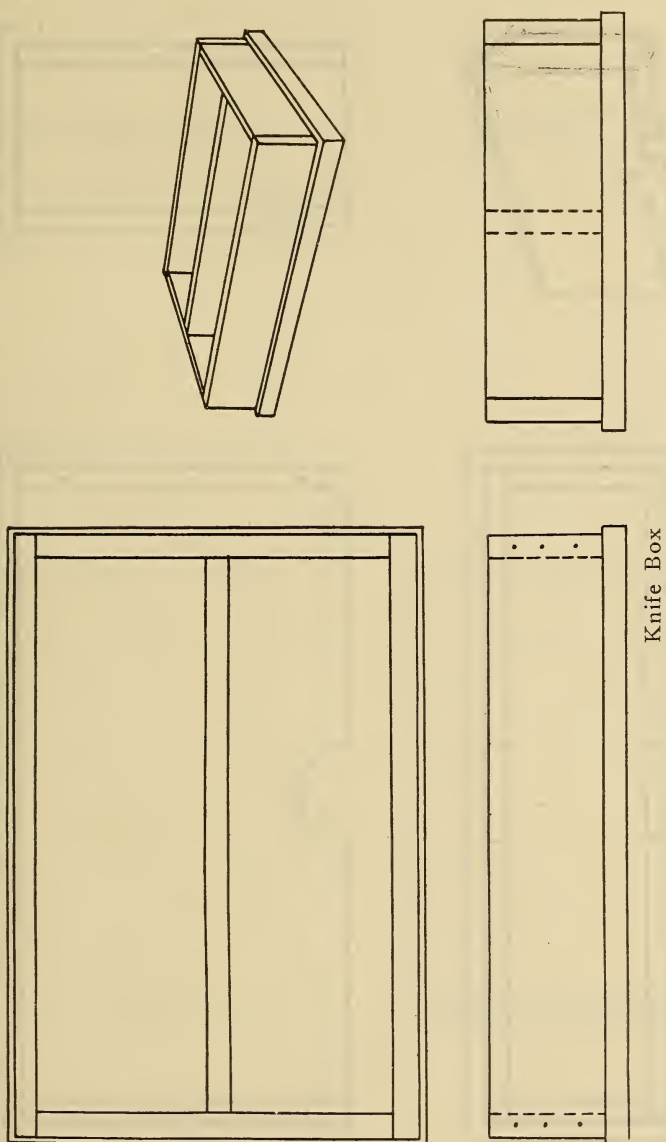
Key Boards, Bill File

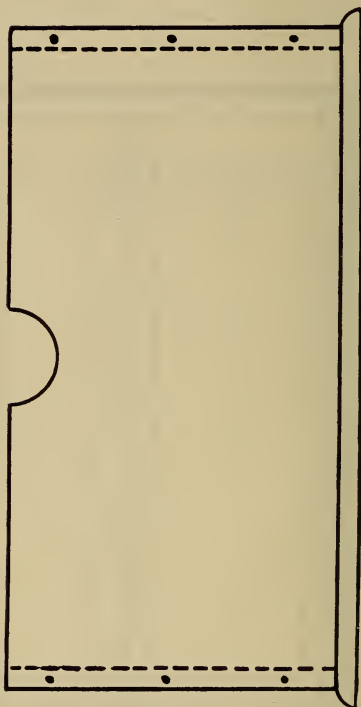
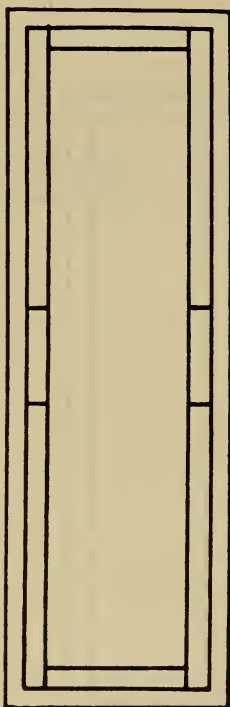
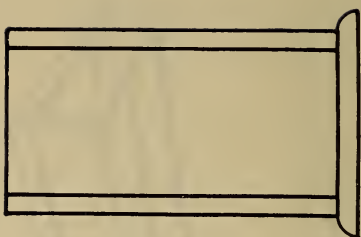


Tie Racks

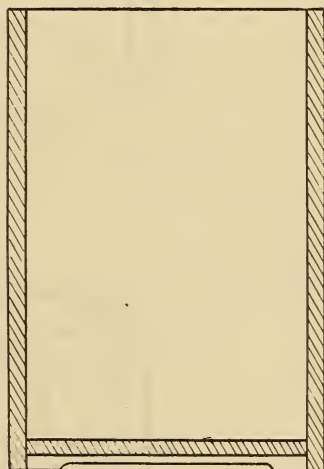
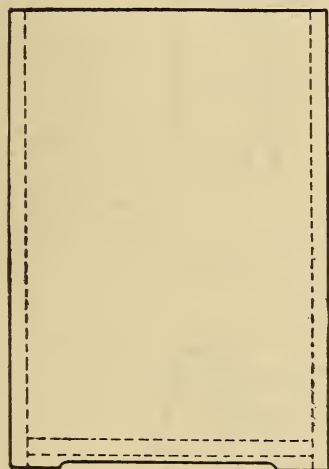
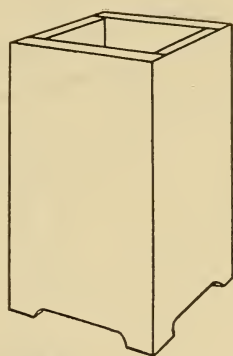
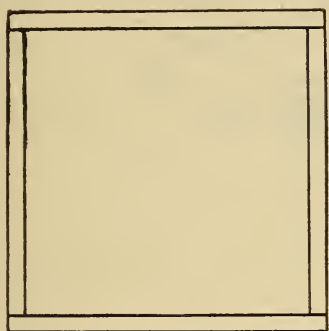


Nail Box

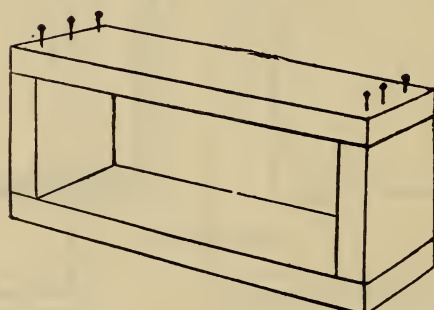
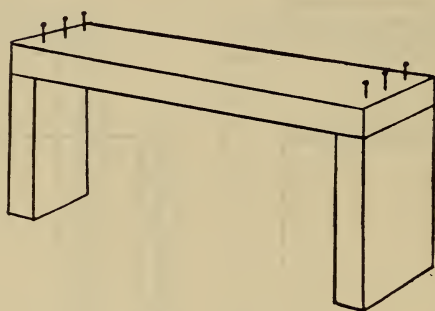
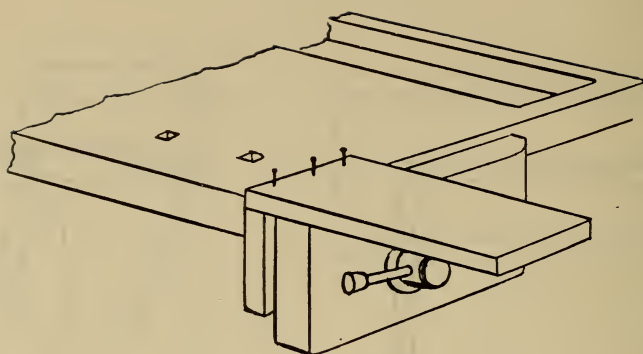




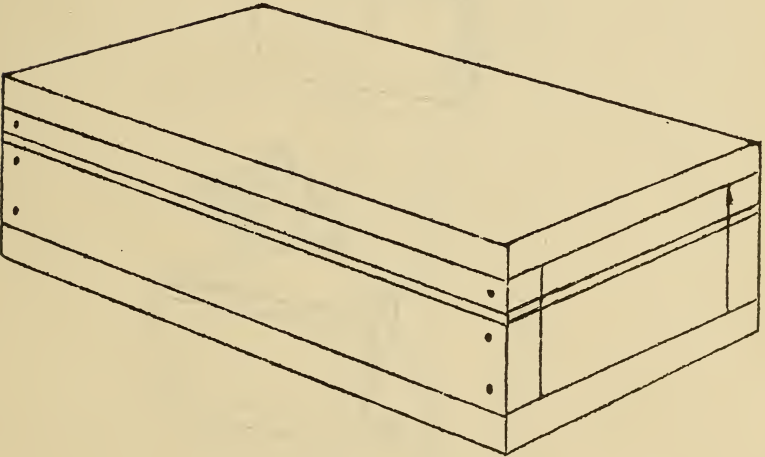
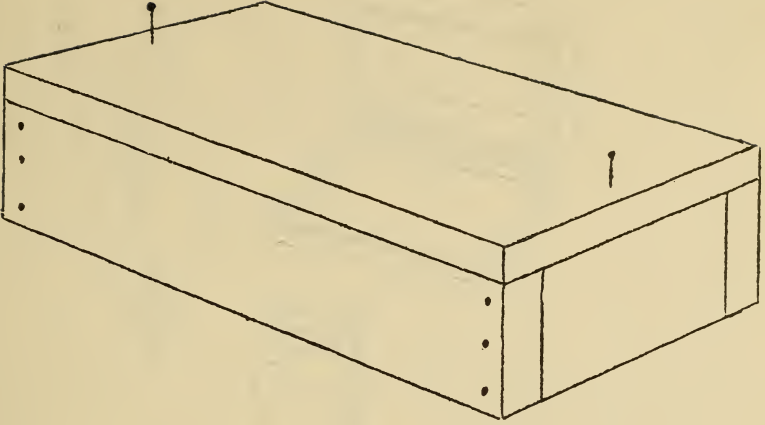
Stationery Box



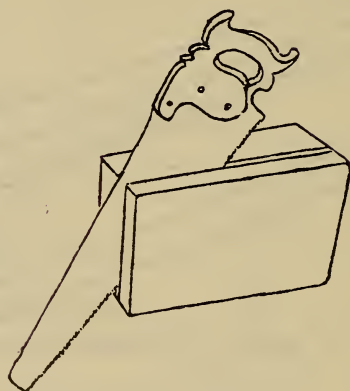
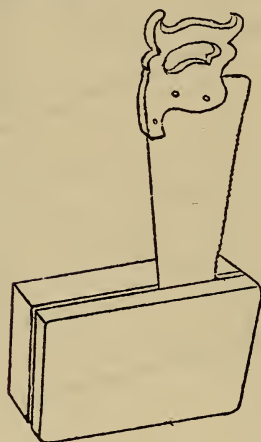
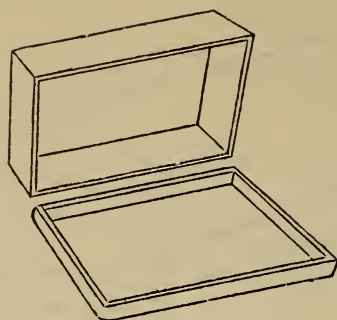
Waste Basket



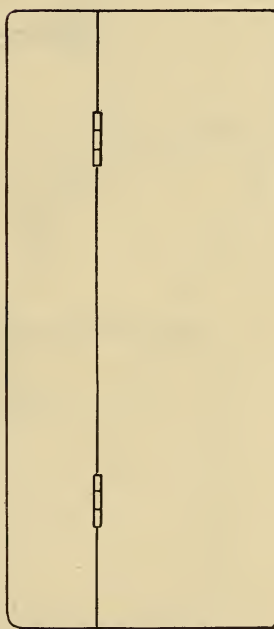
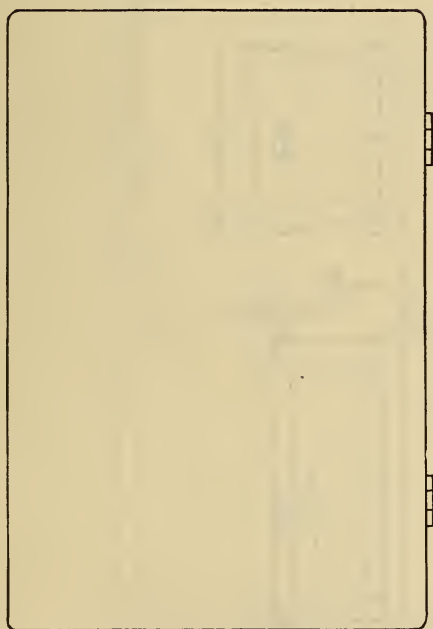
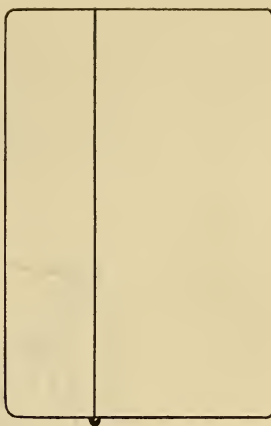
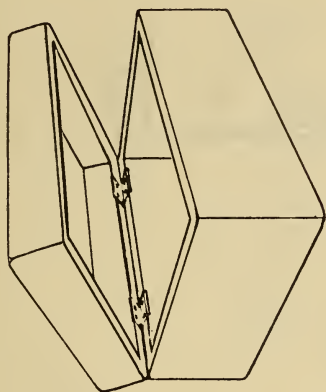
Steps 1, 2 and 3 in Box Assembling



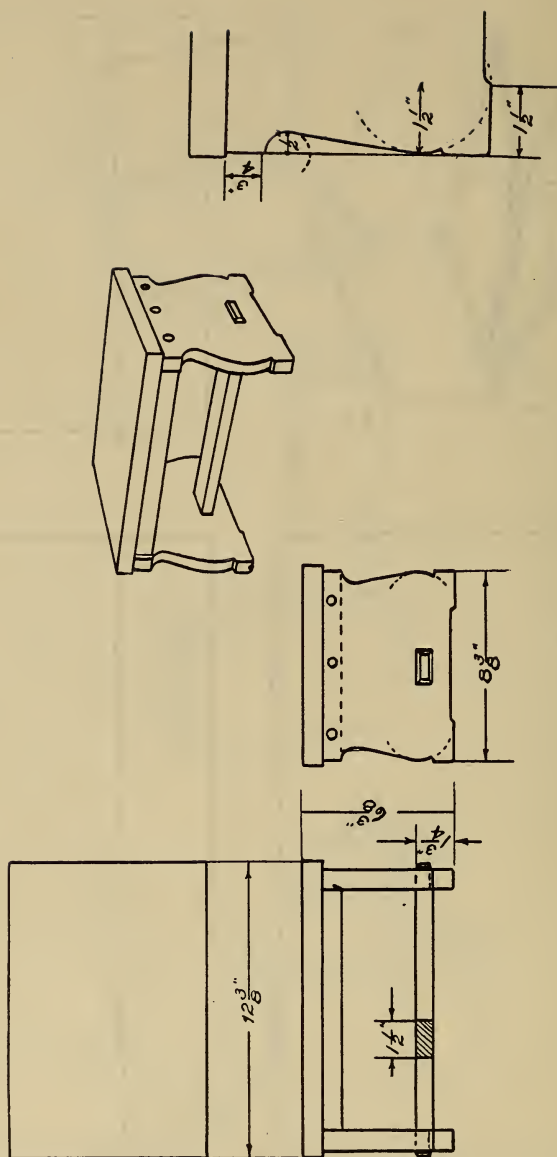
Steps 4 and 5 in Box Assembling



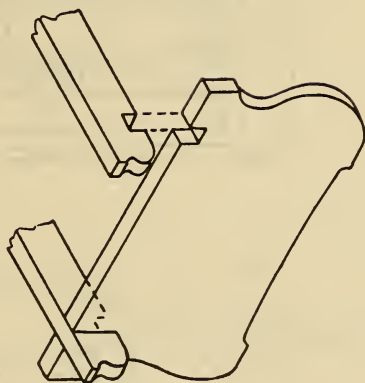
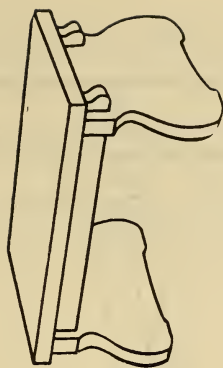
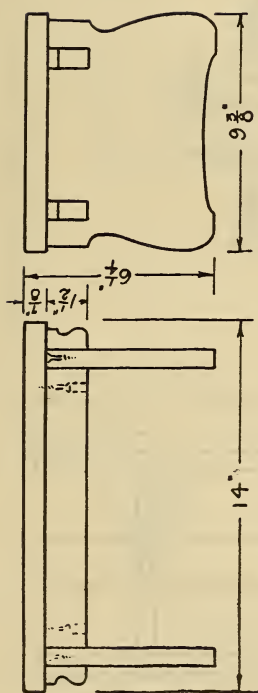
Cutting Off Lid of Box



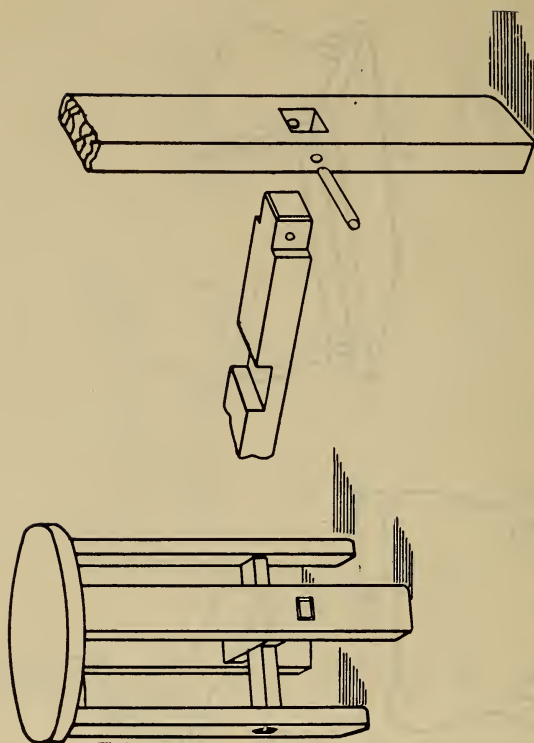
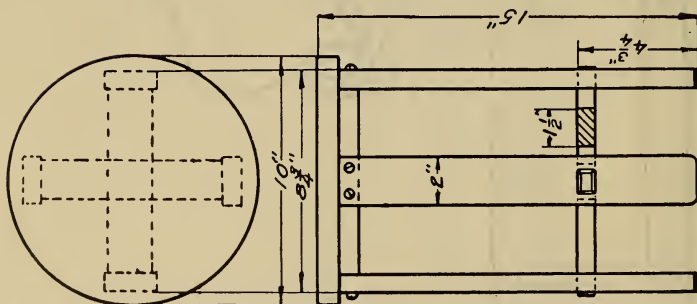
Box Hinged and Finished



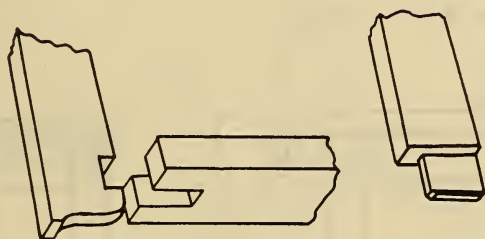
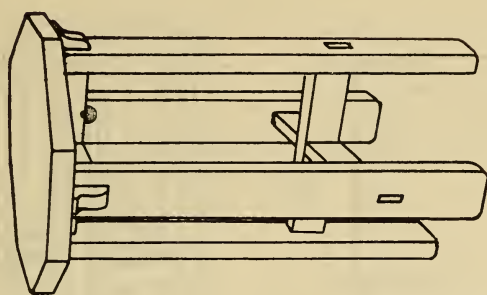
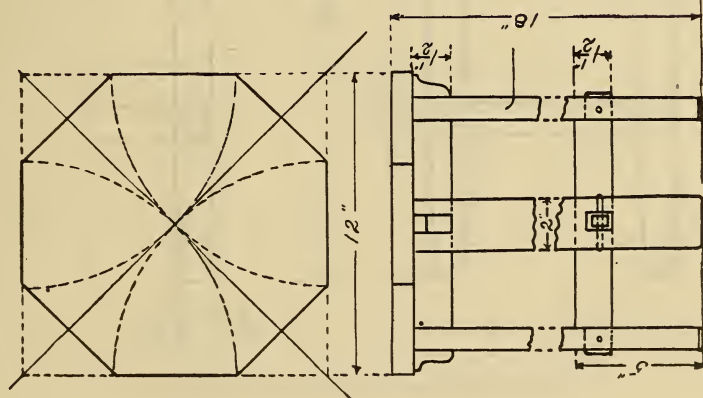
Foot Stool Mortised and Screwed



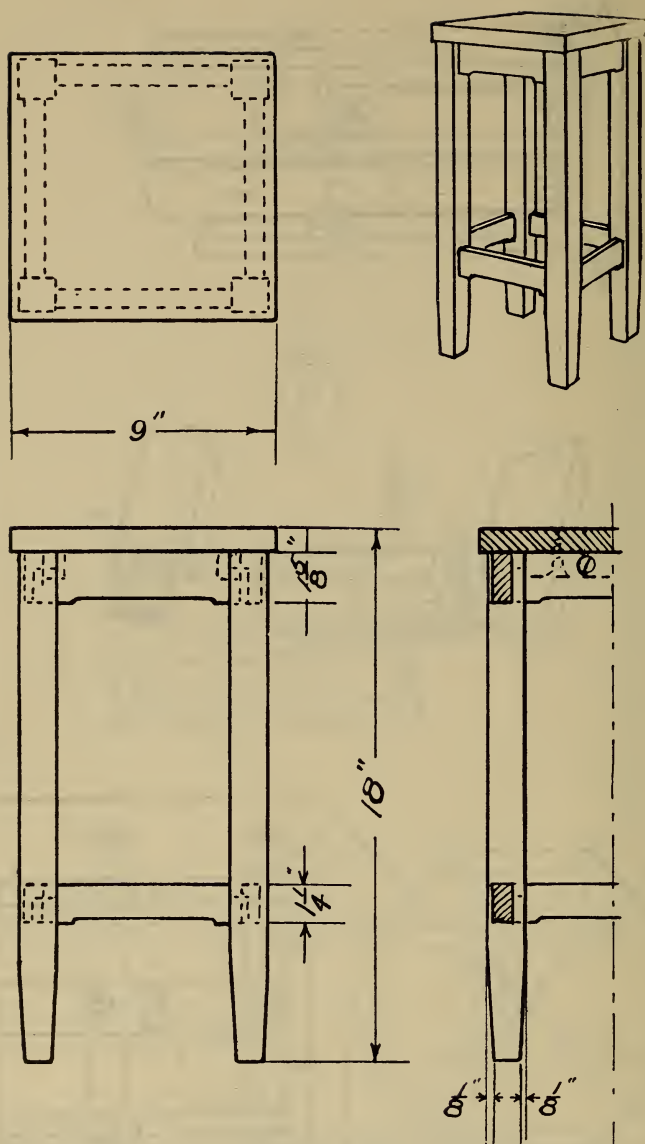
Foot Stool Halved Rails



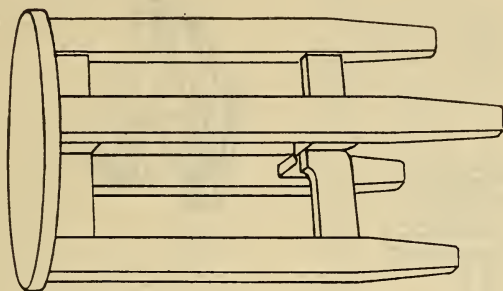
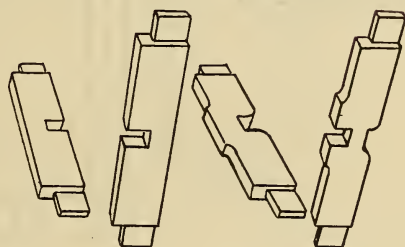
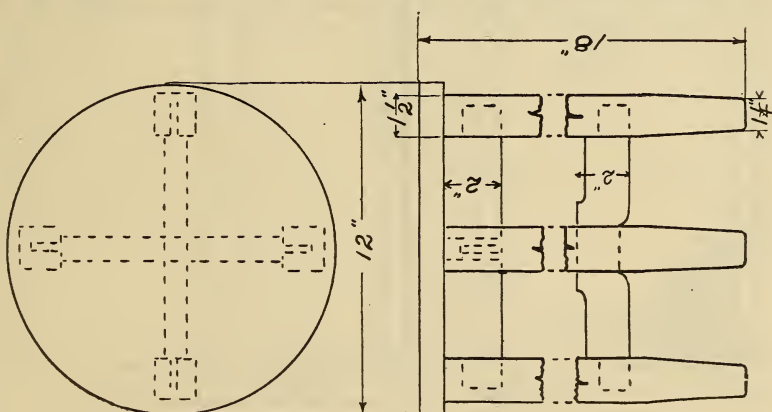
Taboret Half lapped, Mortised and Screwed



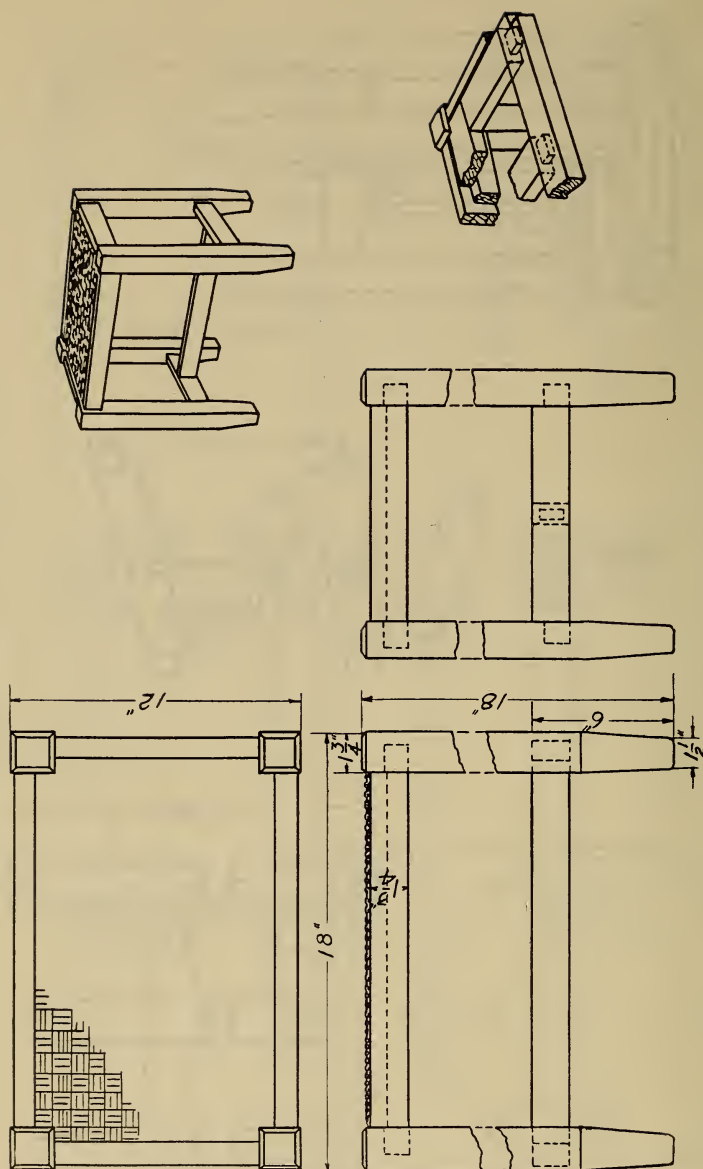
Taboret, Halving on Edge



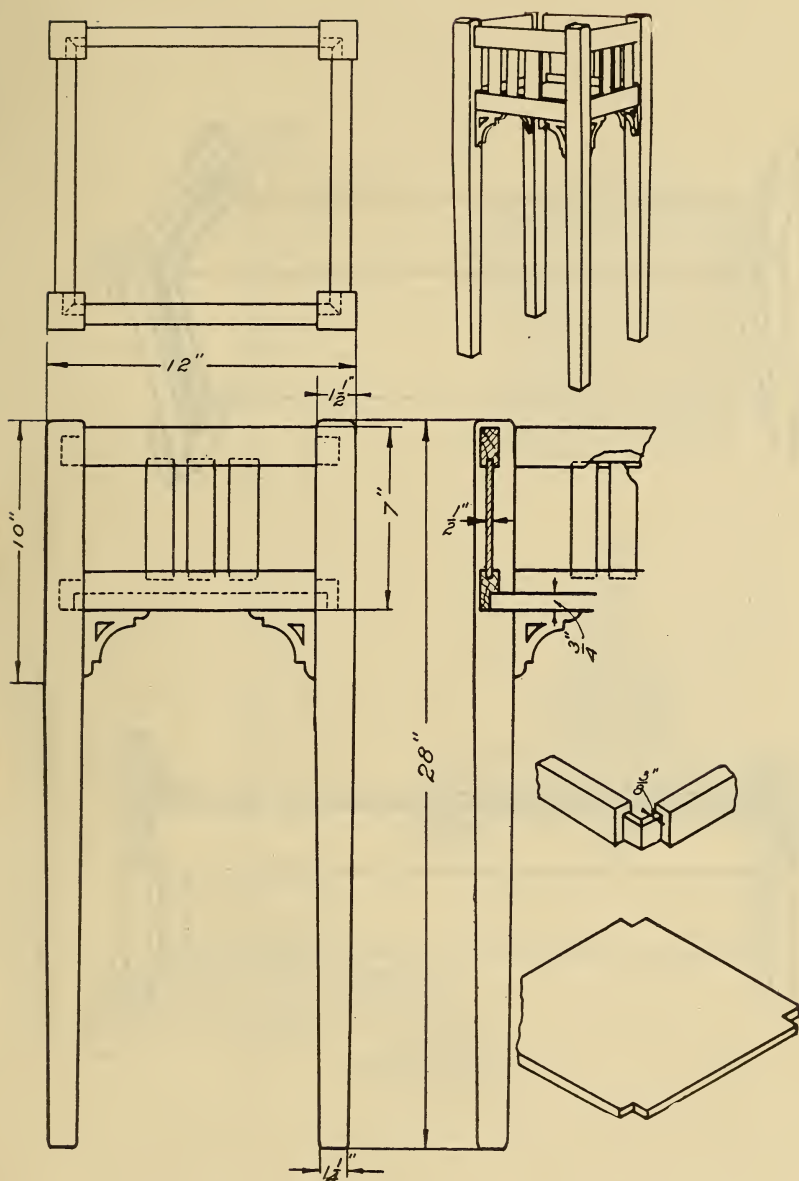
Taboret Mortised and Tenoned—Square



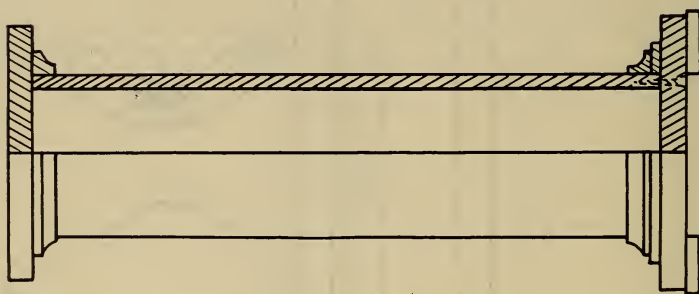
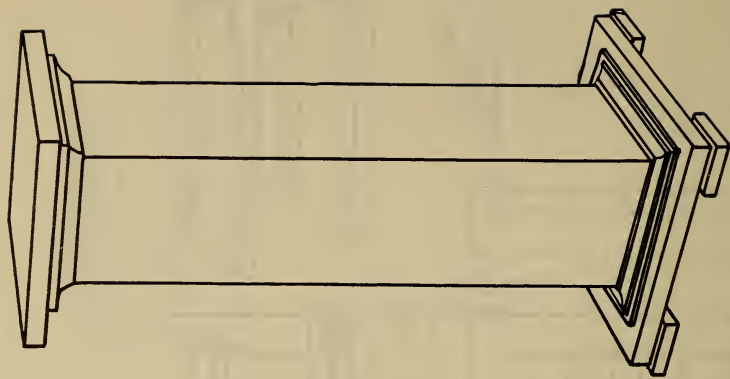
Taboret, Mortised and Tenoned—Round



Stool—Flat Reed Woven Top

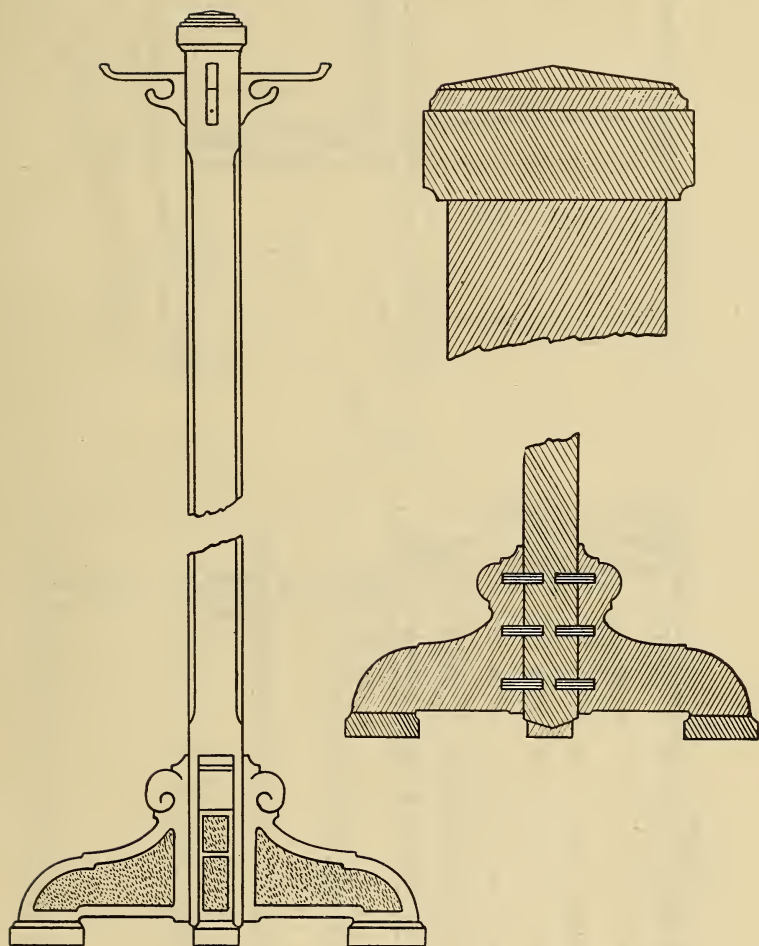


Fern Stand



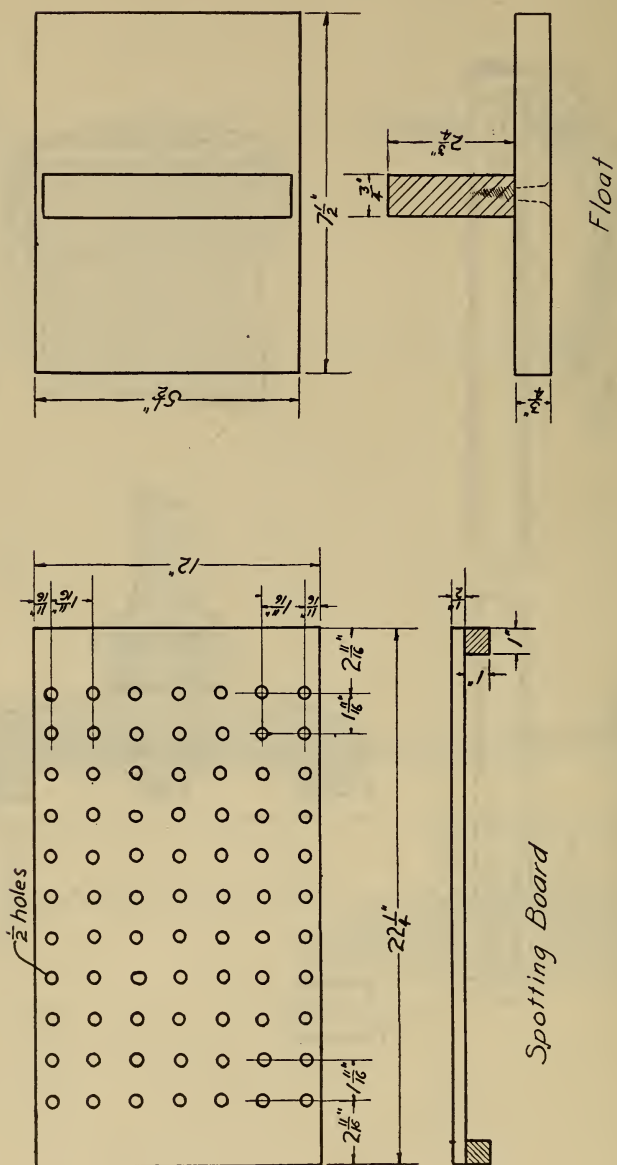
Fern Pedestal

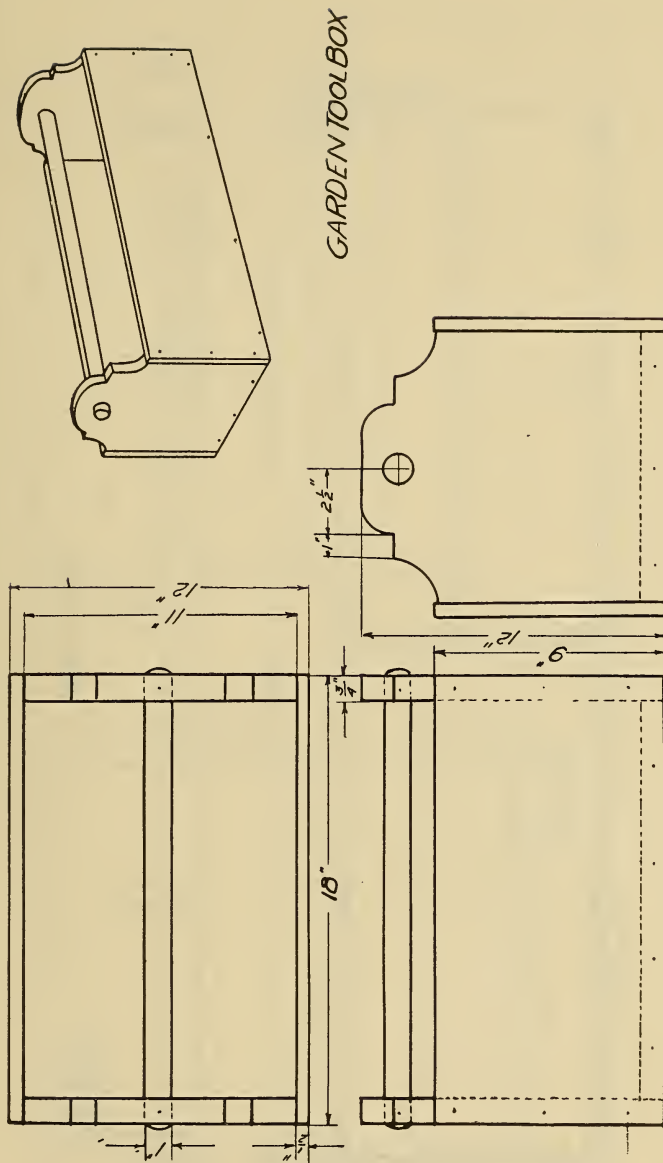
TOP DOWELED TO PEDESTAL



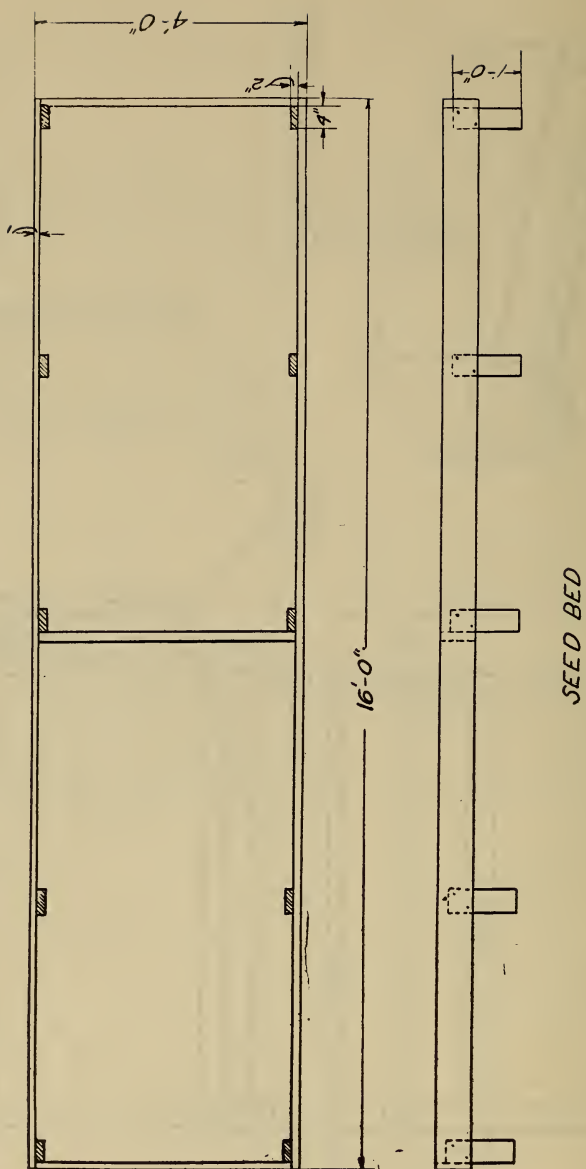
Costumer

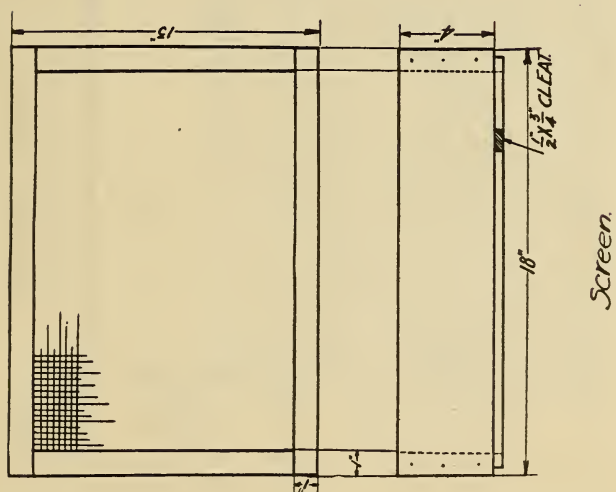
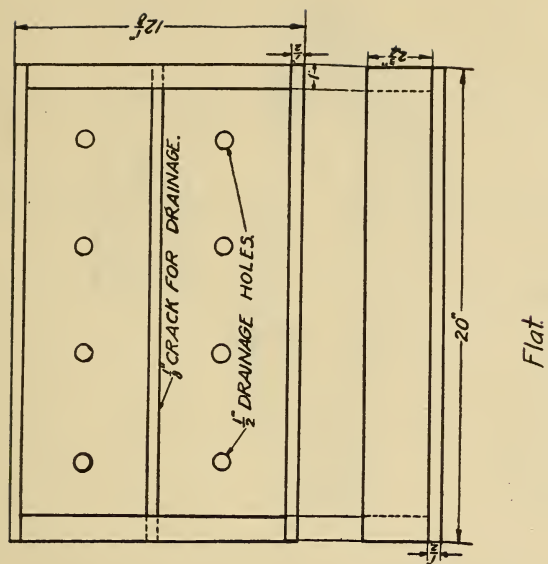
ELEMENTARY GARDEN IMPLEMENTS

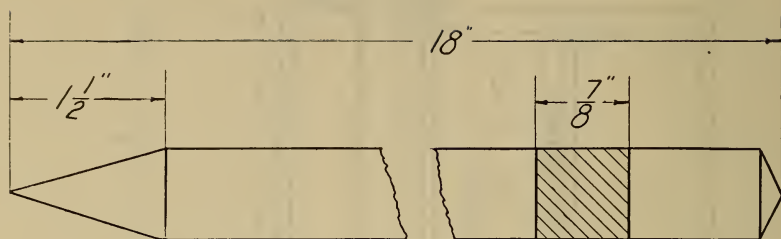




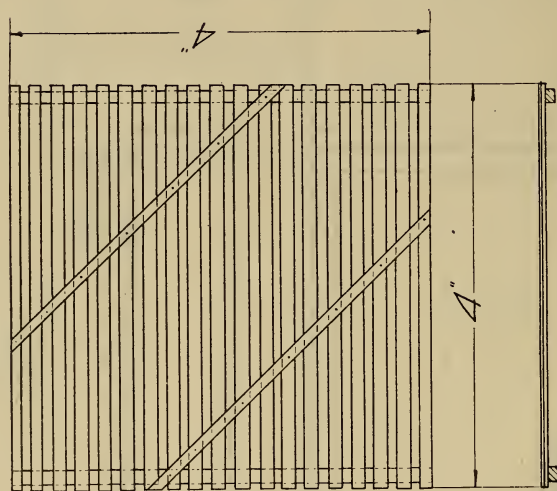
GARDEN TOOL BOX



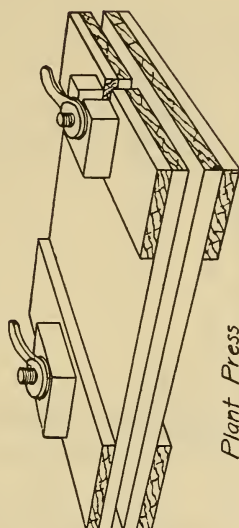
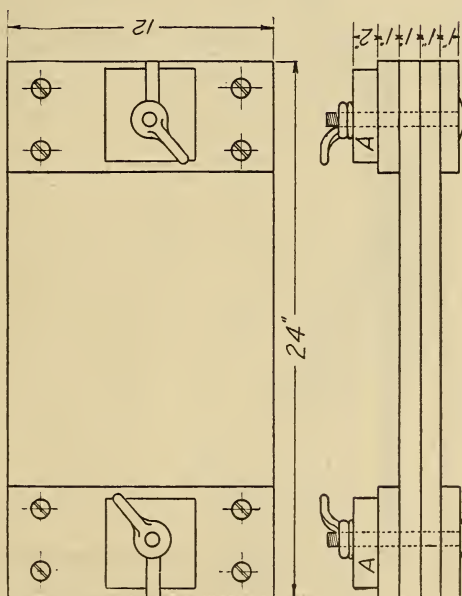




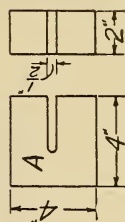
Plant Stake

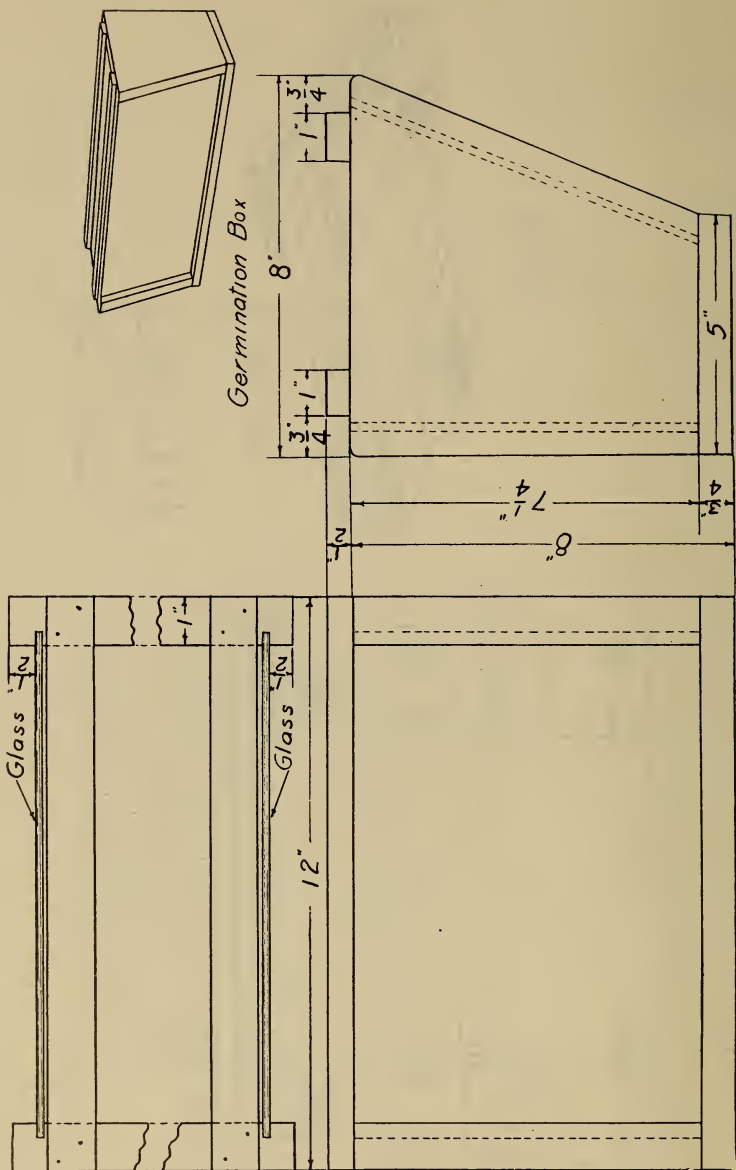


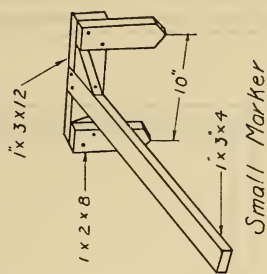
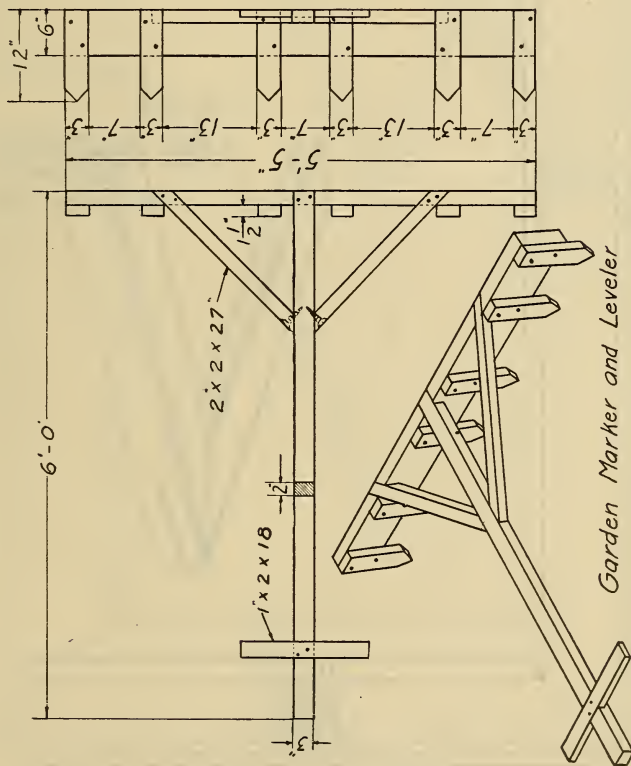
Seed Bed Cover



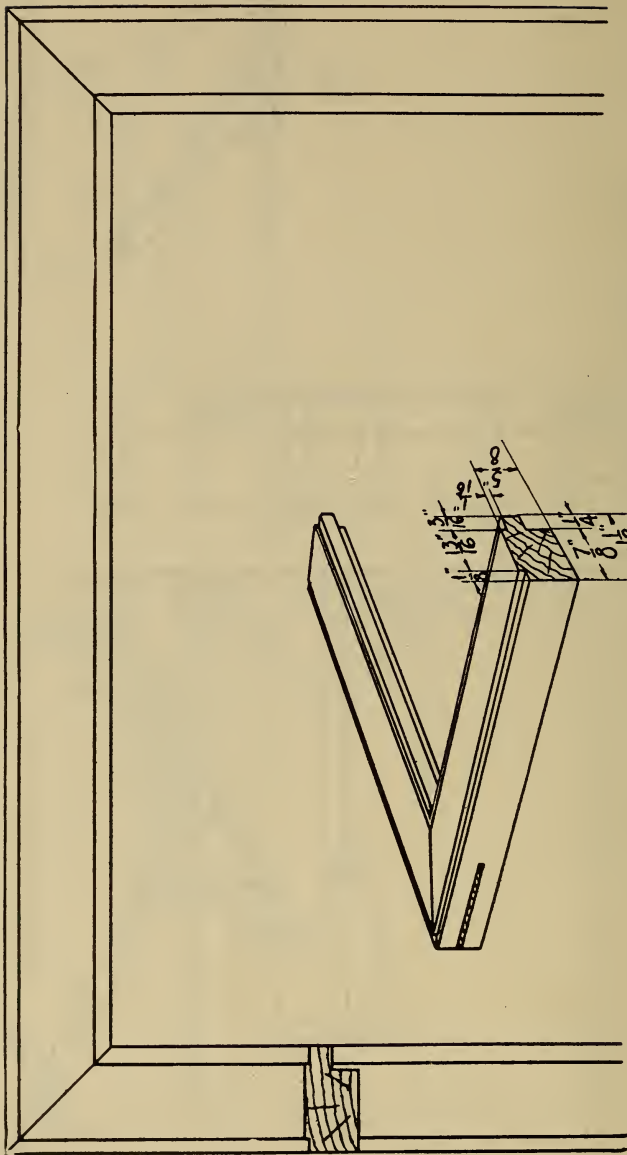
Plant Press



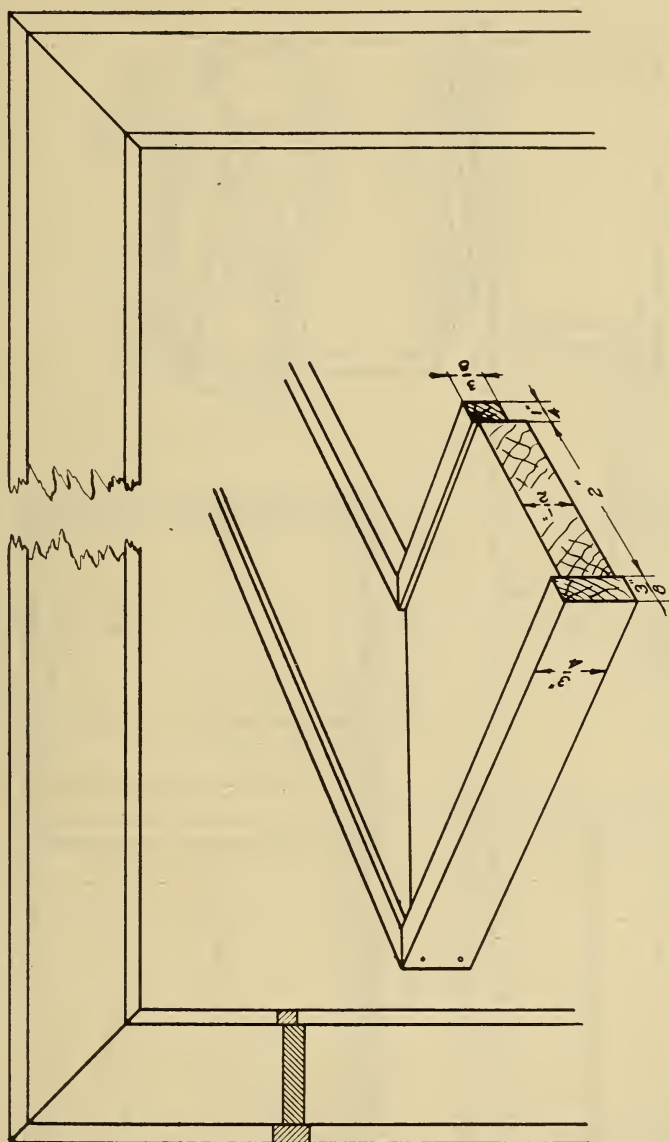




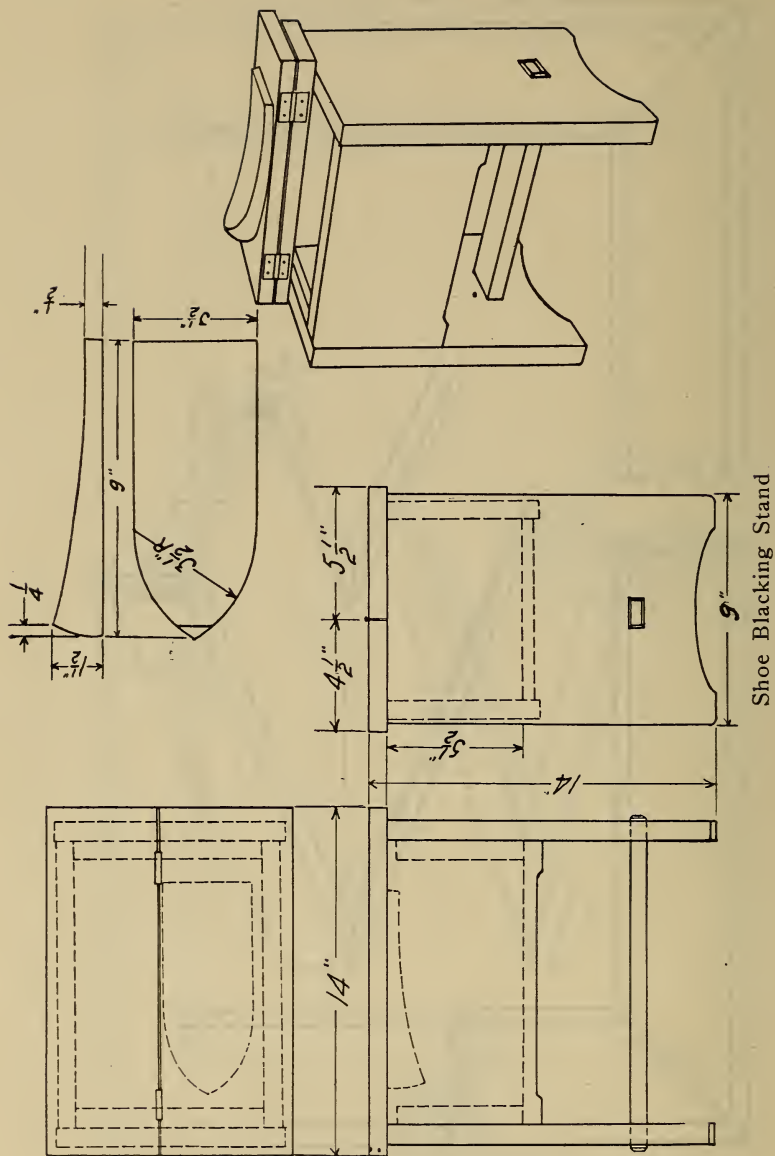
SUPPLEMENTARY PROJECTS



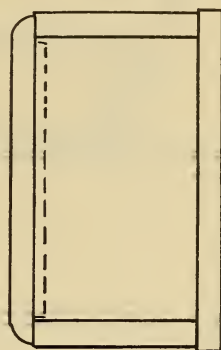
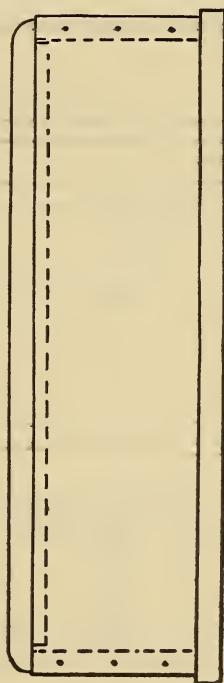
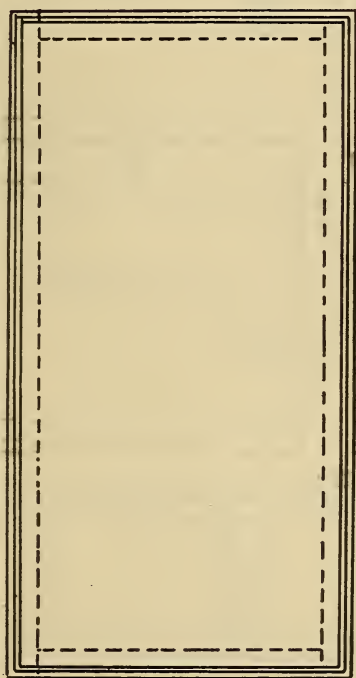
Picture Frame—Spline



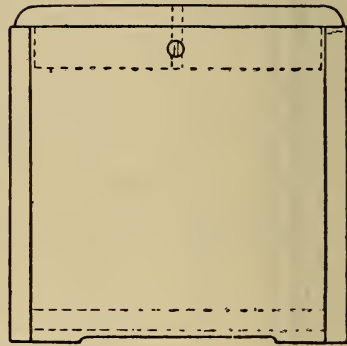
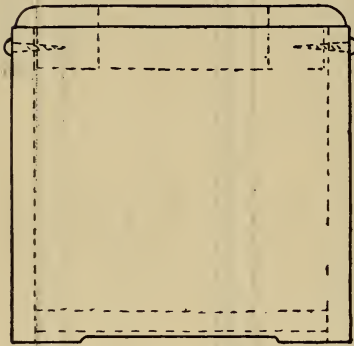
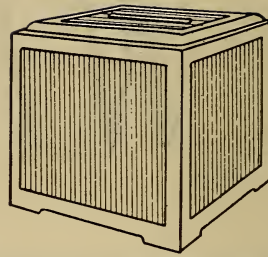
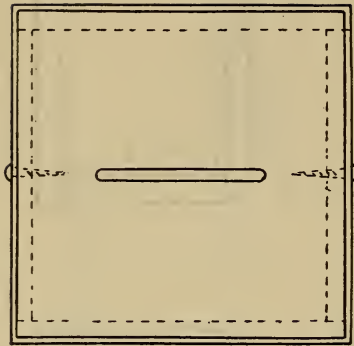
Picture Frame—Nailed



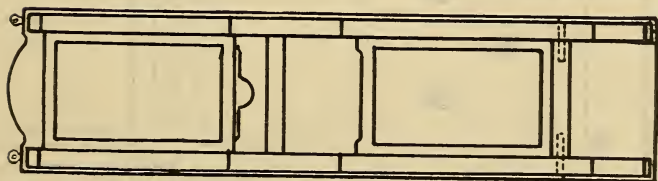
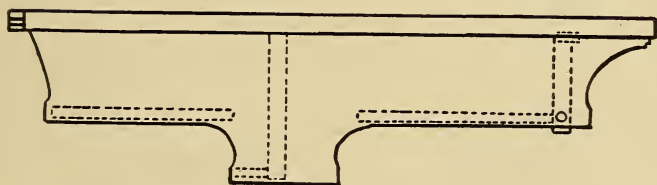
Shoe Blacking Stand



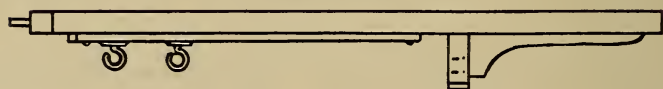
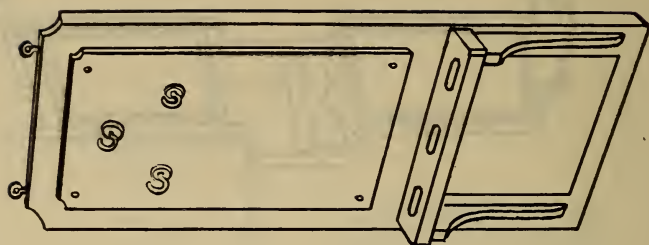
Box With Lid



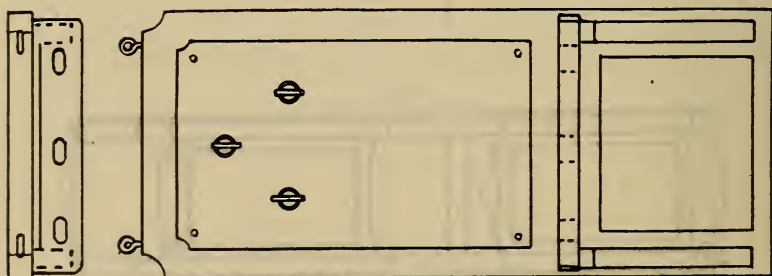
Bank

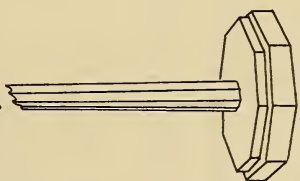
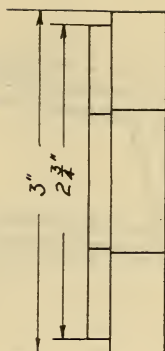
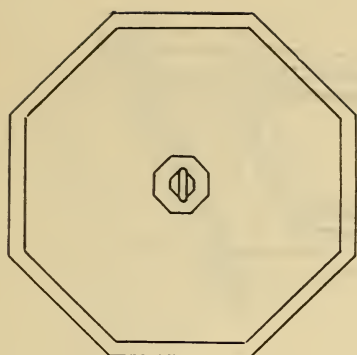


Match Boxes

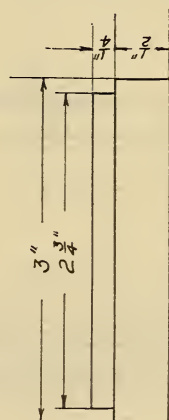
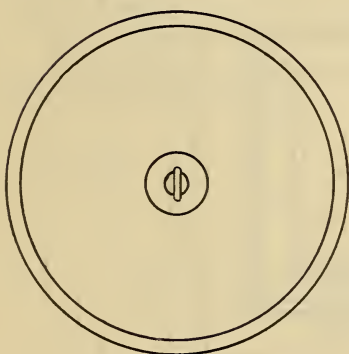


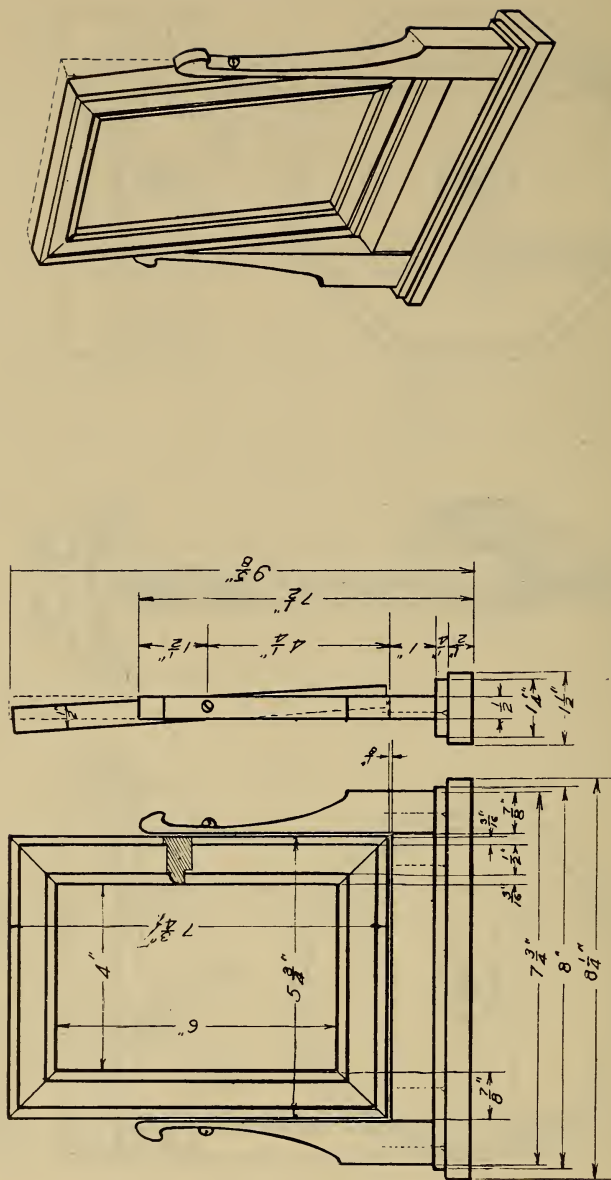
Key Rack



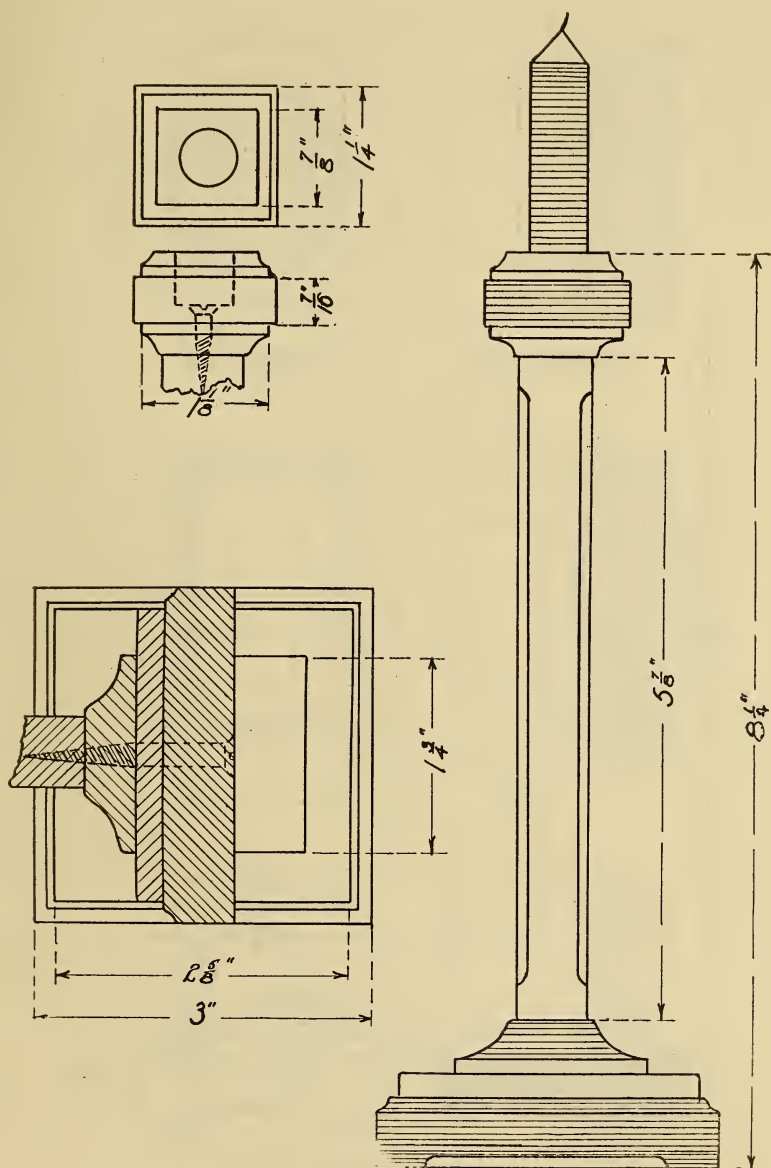


Flag Staff

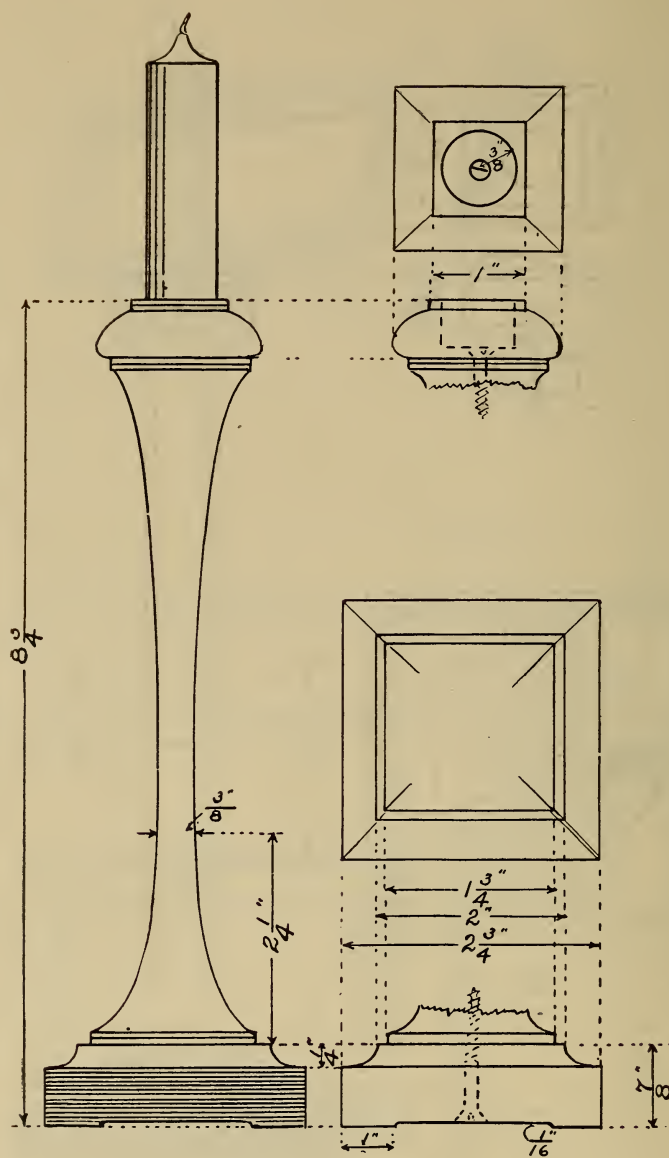




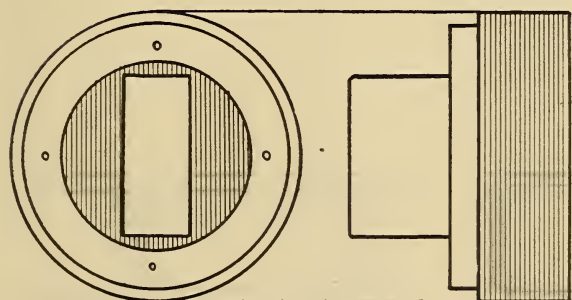
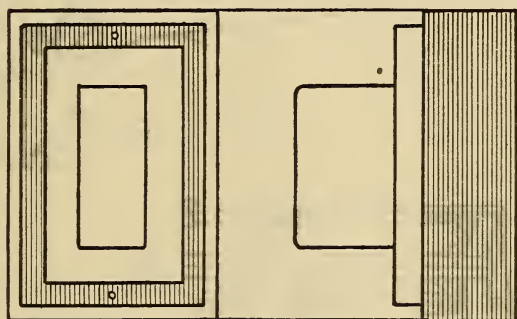
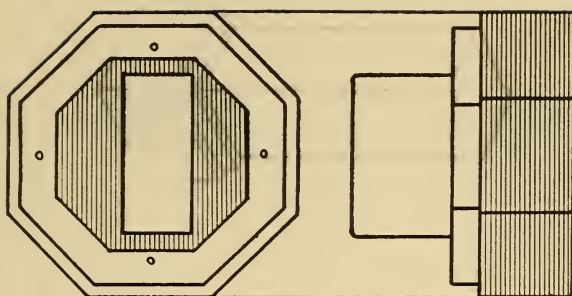
Picture Frame



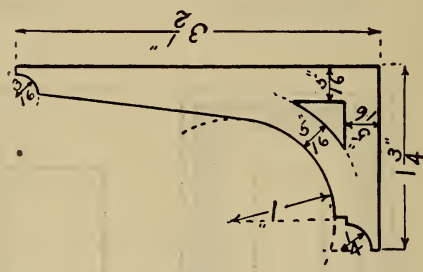
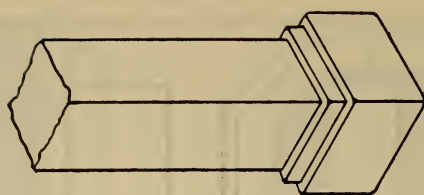
Candle Stick



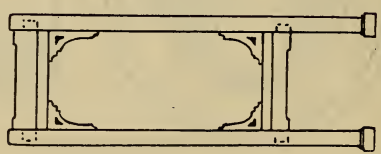
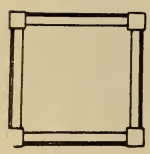
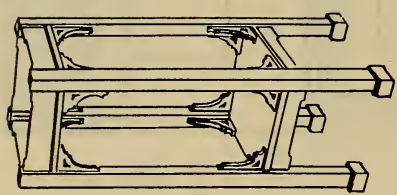
Candle Stick

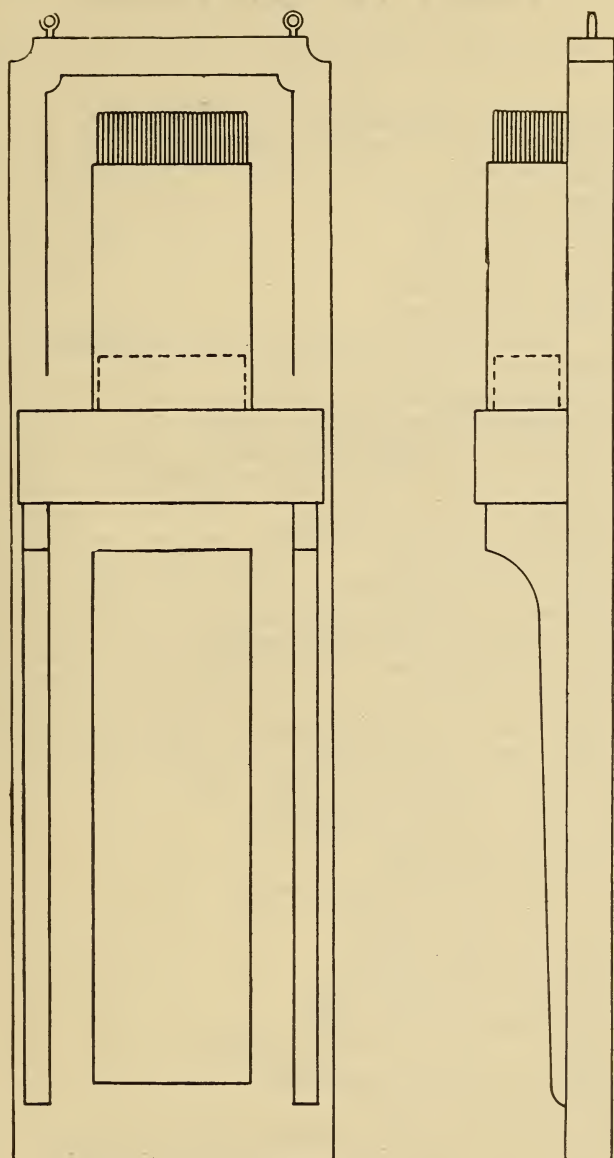


Match Box Holders



Fern Stand





Match Box Holder

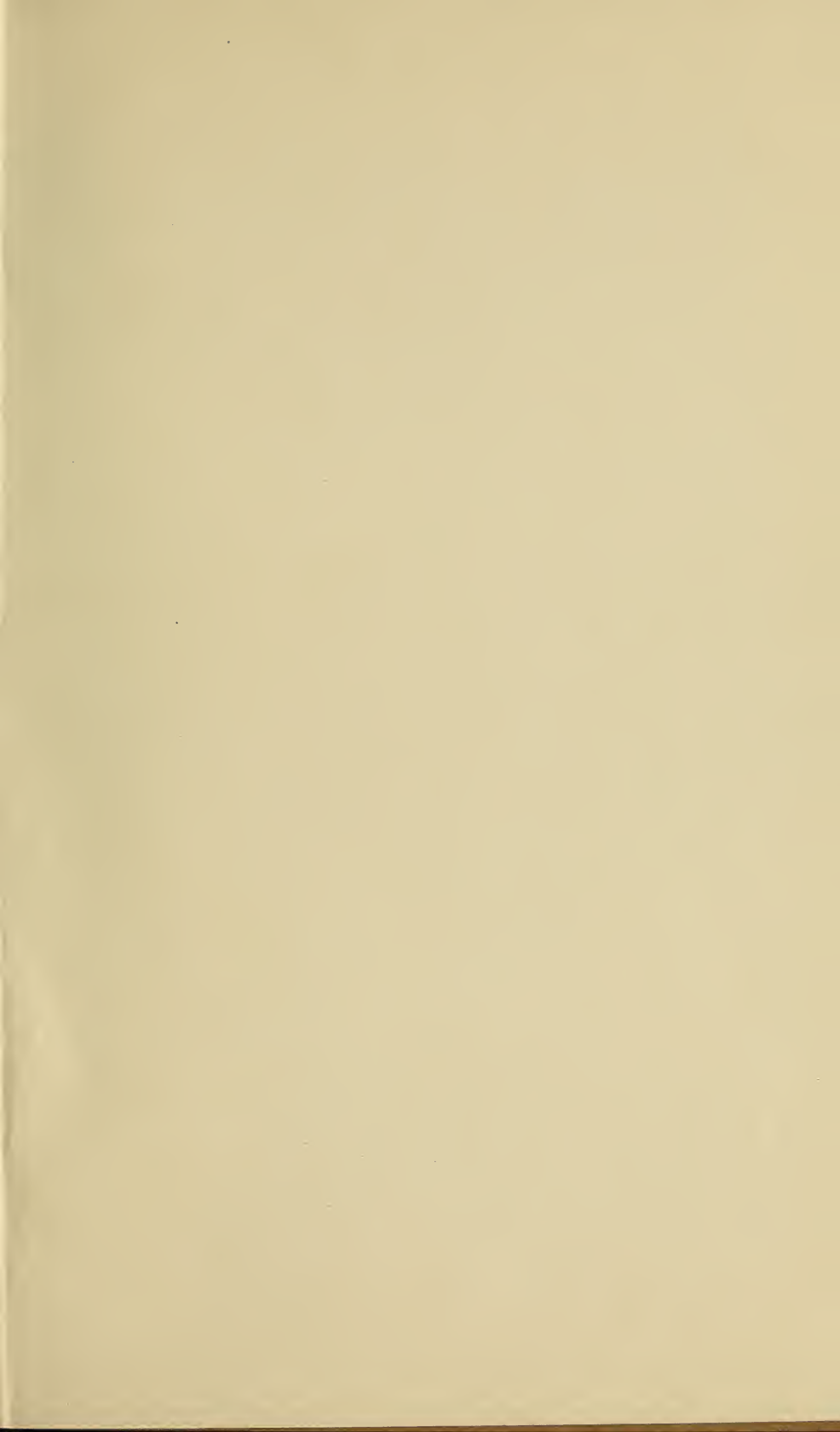
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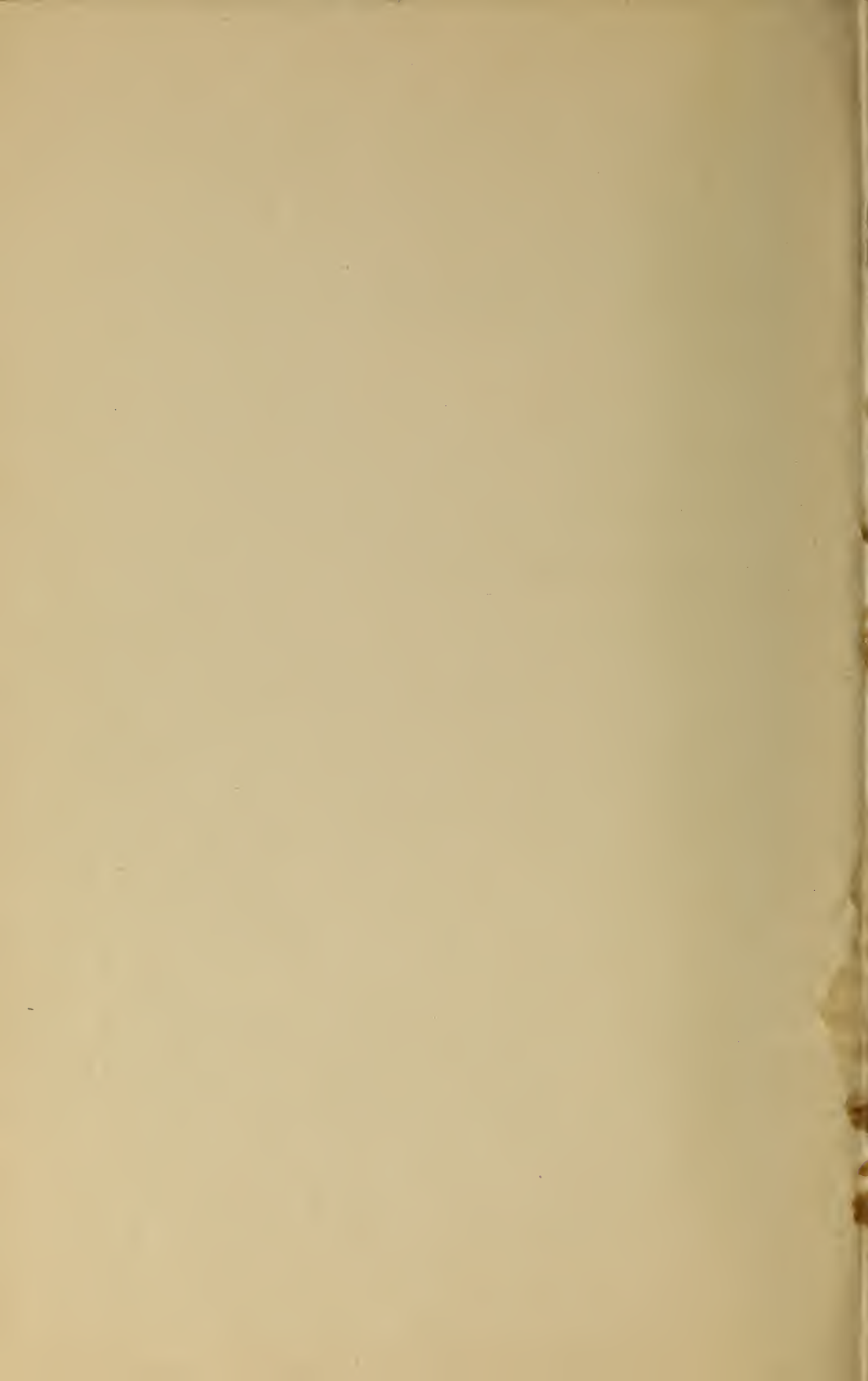
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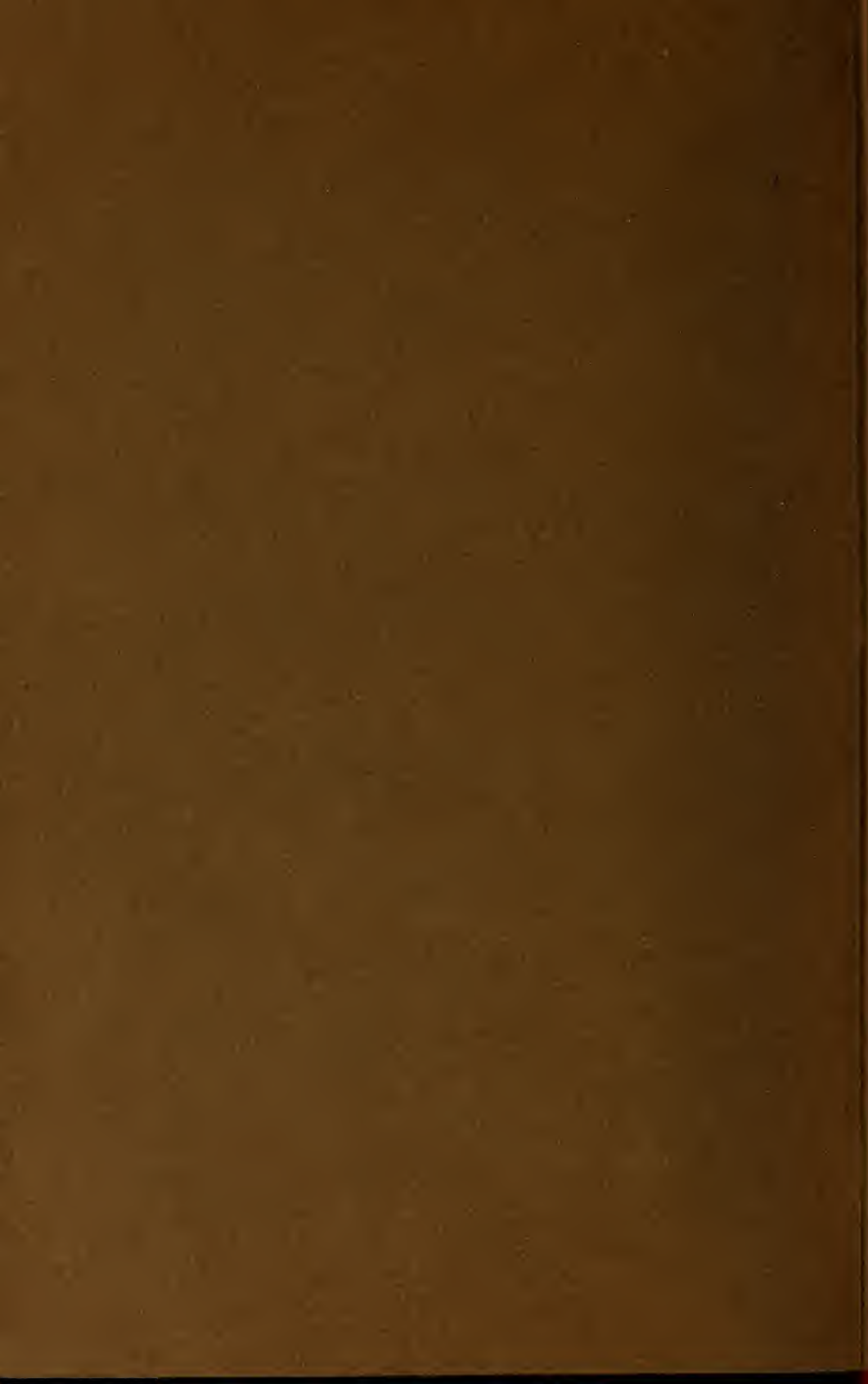
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- 5 & 6. Sixth Grade work.
- 6 & 7. Seventh Grade work.
- 7 & 8. Eighth Grade work.
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- 12 & 13. Principles of proportion.
- 13 & 14. Classification of construction processes.
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